

## **APPENDIX C**

### **ANALYTICAL DATA**

## **TOLUENE-SOLUBLE ORGANICS**



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
Phone: 905-331-3111, FAX: 905-331-4567

## Certificate of Analysis

ALS Project Contact: Whitney Davis  
ALS Project ID: EQM100  
ALS WO#: L1830765  
Date of Report: 24-Oct-16  
Date of Sample Receipt: 19-Sep-16

Client Name: Environmental Quality Management Inc.  
Client Address: 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
Client Contact: Doug Allen  
Client Project ID: 050074.0172 AK MIDDLETOWN

### COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 315 (SA 21-Oct-2016)

Sample processing was completed with toluene in place of methylene chloride, as per client request.

After the acetone rinse fractions were blown down and weights taken, front half toluene fractions were combined with acetone rinse residues to allow for MCEM analysis. These results are reported under the acetone sample headers, but pertain to the combined fractions.

During sample processing, Fractions 3S and 3W were inadvertently combined, and extracted together. A single 3W + 3S MCEM value is reported for this combined solution, instead of two separate values.

All solutions were weighed before, and after processing to provide total solution masses. These are not explicitly required in the method, but are included for completion.

P. Elder 21-Oct-16

### REPORT FLAGS:


J - The value is uncertain and below what can be reliably identified as positive with a  $\geq 99\%$  confidence limit (i.e. below the laboratory determined MDL).

LCB = Laboratory Control Blank

CVS = Continuing Verification Standard Sample (limits:  $\pm 2$  in the last decimal)

LOR = Limit of Reporting

Certified by: \_\_\_\_\_

  
Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-315-1 FILTER	C-315-1 FRONT 1/2 ACETONE	C-315-1 FRONT 1/2 TOLUENE	C-315-1 ACETONE/ TOLUENE	C-315-1 BACK 1/2 H2O
ALS Sample ID	L1830765-1	L1830765-2	L1830765-3	L1830765-4	L1830765-5
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	12-Sep-16	12-Sep-16	12-Sep-16	12-Sep-16	12-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR	mg	mg	mg	mg
Filter Particulate Matter	0.8	37.1	-	-	-
Filter MCEM Particulate Matter	0.4	0.3 J	-	-	-
Acetone Particulate Matter	0.4	-	40.7	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	5.1	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	2.1	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	25.2	-	-
Toluene Rinse Mass	0.02	-	-	20.1	-
Acetone/Toluene Mass	0.02	-	-	111	-
Water Impinger Mass	0.02	-	-	-	459

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-315-2 FILTER	C-315-2 FRONT 1/2 ACETONE	C-315-2 FRONT 1/2 TOLUENE	C-315-2 ACETONE/ TOLUENE	C-315-2 BACK 1/2 H2O
ALS Sample ID	L1830765-6	L1830765-7	L1830765-8	L1830765-9	L1830765-10
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	13-Sep-16	13-Sep-16	13-Sep-16	13-Sep-16	13-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR	mg	mg	mg	mg
Filter Particulate Matter	0.8	9.2	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	51.1	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	14.0	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	1.5	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	63.2	-	-
Toluene Rinse Mass	0.02	-	-	49.9	-
Water Mass	0.02	-	-	86.3	-
Water Impinger Mass	0.02	-	-	-	446

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-315-3 FILTER	C-315-3 FRONT 1/2 ACETONE	C-315-3 FRONT 1/2 TOLUENE	C-315-3 ACETONE/ TOLUENE	C-315-3 BACK 1/2 H2O
ALS Sample ID	L1830765-11	L1830765-12	L1830765-13	L1830765-14	L1830765-15
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	14-Sep-16	14-Sep-16	14-Sep-16	14-Sep-16	14-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR				
	mg	mg	mg	mg	mg
Filter Particulate Matter	0.8	49.3	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	77.3	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	33.1	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	3.2	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	52.5	-	-
Toluene Rinse Mass	0.02	-	-	109	-
Water Mass	0.02	-	-	129	-
Water Impinger Mass	0.02	-	-	-	439

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-315-1 FILTER	P-315-1 FRONT 1/2 ACETONE	P-315-1 FRONT 1/2 TOLUENE	P-315-1 ACETONE/ TOLUENE	P-315-1 BACK 1/2 H2O
ALS Sample ID	L1830765-16	L1830765-17	L1830765-18	L1830765-19	L1830765-20
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	13-Sep-16	13-Sep-16	13-Sep-16	13-Sep-16	13-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR	mg	mg	mg	mg
Filter Particulate Matter	0.8	<	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	2.1	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	4.0	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	10.5	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	68.1	-	-
Toluene Rinse Mass	0.02	-	-	51.7	-
Water Mass	0.02	-	-	133	-
Water Impinger Mass	0.02	-	-	-	274

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-315-2 FILTER	P-315-2 FRONT 1/2 ACETONE	P-315-2 FRONT 1/2 TOLUENE	P-315-2 ACETONE/ TOLUENE	P-315-2 BACK 1/2 H2O
ALS Sample ID	L1830765-21	L1830765-22	L1830765-23	L1830765-24	L1830765-25
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	14-Sep-16	14-Sep-16	14-Sep-16	14-Sep-16	14-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR	mg	mg	mg	mg
Filter Particulate Matter	0.8	0.3 J	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	2.5	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	10.9	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	24.8	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	80.7	-	-
Toluene Rinse Mass	0.02	-	-	98.6	-
Water Mass	0.02	-	-	139	-
Water Impinger Mass	0.02	-	-	-	306

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-315-3 FILTER	P-315-3 FRONT 1/2 ACETONE	P-315-3 FRONT 1/2 TOLUENE	P-315-3 ACETONE/ TOLUENE	P-315-3 BACK 1/2 H2O
ALS Sample ID	L1830765-26	L1830765-27	L1830765-28	L1830765-29	L1830765-30
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	15-Sep-16	15-Sep-16	15-Sep-16	15-Sep-16	15-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR	mg	mg	mg	mg
Filter Particulate Matter	0.8	<	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	2.4	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	9.4	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	3.4	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	86.9	-	-
Toluene Rinse Mass	0.02	-	-	68.3	-
Water Mass	0.02	-	-	76.4	-
Water Impinger Mass	0.02	-	-	-	266

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	BLANK - FILTER	BLANK - FRONT 1/2 ACETONE	BLANK - FRONT 1/2 TOLUENE	BLANK - ACETONE/ TOLUENE	BLANK - BACK 1/2 H2O
ALS Sample ID	L1830765-31	L1830765-32	L1830765-33	L1830765-34	L1830765-35
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	15-Sep-16	15-Sep-16	15-Sep-16	15-Sep-16	15-Sep-16
Date of Receipt	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16	19-Sep-16
<b>PM via Gravimetric Analysis</b>					
Method 315	LOR				
	mg	mg	mg	mg	mg
Filter Particulate Matter	0.8	<	-	-	-
Filter MCEM Particulate Matter	0.4	<	-	-	-
Acetone Particulate Matter	0.4	-	2.4	-	-
Acetone + Toluene MCEM Particulate Matter	0.4	-	1.9	-	-
3W + 3S MCEM Particulate Matter	0.4	-	-	<	-
<b>Sample Masses</b>					
	g	g	g	g	g
Acetone Rinse Mass	0.02	-	82.8	-	-
Toluene Rinse Mass	0.02	-	-	30.9	-
Water Mass	0.02	-	-	91.9	-
Water Impinger Mass	0.02	-	-	-	107

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	LCB		
ALS Sample ID	L1830765-LCB		
Matrix	n/a		
Analysis type	Sample		
Sampling Date/Time	n/a		
Date of Receipt	n/a		
PM via Gravimetric Analysis	LOR		
Method 315	mg	mg	
Filter Particulate Matter	0.8	-	
Filter MCEM Particulate Matter	0.4	-	
Acetone Particulate Matter	0.4	0.2	J
Acetone + Toluene MCEM Particulate Matter	0.4	-	
3W + 3S MCEM Particulate Matter	0.4	-	
Sample Masses			
	g	g	
Acetone Rinse Mass	0.02	29.4	
Toluene Rinse Mass	0.02	-	
Water Mass	0.02	29.4	
Water Impinger Mass	0.02	-	

## **FILTERABLE PM AND HAP METALS**



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## Certificate of Analysis

ALS Project Contact: Whitney Davis  
ALS Project ID: EQM100  
ALS WO#: L1826946  
Date of Report: 19-Sep-16  
Date of Sample Receipt: 9-Sep-16

Client Name: Environmental Quality Management Inc.  
Client Address: 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
Client Contact: Doug Allen  
Client Project ID: 50074.0172 AK STEEL ICR

### COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 5 (PE 19-Sep-16)

### REPORT FLAGS:

J - The value is uncertain and below what can be reliably identified as positive with a  $\geq 99\%$  confidence limit (i.e. below the laboratory determined MDL).

LCB = Laboratory Control Blank

CVS = Continuing Verification Standard Sample (limits:  $\pm 2$  in the last decimal)

LOR = Limit of Reporting

A handwritten signature in black ink, appearing to read "R. Stolys", is written over a horizontal line.

Certified by: \_\_\_\_\_

Rachael Stolys  
Account Manager

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# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-5/29-1	P-5/29-2	P-5/29-3	C-5/29-1	C-5/29-2
ALS Sample ID	L1826946-1	L1826946-2	L1826946-3	L1826946-4	L1826946-5
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	29-Aug-16	31-Aug-16	6-Sep-16	6-Sep-16	7-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
PM via Gravimetric Analysis					
Method 5	LOR				
	mg	mg	mg	mg	mg
Filter Particulate Matter	0.8	1.0	1.5	0.9	178
Acetone Particulate Matter	0.4	1.8	2.7	1.9	130
	g	g	g	g	g
Acetone Mass	0.02	37.1	81.6	59.9	18.3
					27.0

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-5/29-3	5/29-BLANK	LCB
ALS Sample ID	L1826946-6	L1826946-7	L1826946-LCB
Matrix	Stack	Stack	n/a
Analysis type	Sample	Sample	Sample
Sampling Date/Time	7-Sep-16	8-Sep-16	n/a
Date of Receipt	9-Sep-16	9-Sep-16	n/a
PM via Gravimetric Analysis			
Method 5	LOR		
	mg	mg	mg
Filter Particulate Matter	0.8	159	0.4 J
Acetone Particulate Matter	0.4	77.6	< 0.1 J
	g	g	g
Acetone Mass	0.02	30.8	46.0 30.8



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## Certificate of Analysis

ALS Project Contact: Whitney Davis  
ALS Project ID: EQM100  
ALS WO#: L1826946  
Date of Report: 29-Sep-16  
Date of Sample Receipt: 9-Sep-16

Client Name: Environmental Quality Management Inc.  
Client Address: 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
Client Contact: Doug Allen  
Client Project ID: 50074.0172 AK Steel ICR

### COMMENTS:

Mercury Analysis via CVAA using Method USEPA 7470A (NOB 2016-09-27)

The Laboratory Control Sample Duplicate (LCSD) recovery in fraction 1B (89%) is just below the method control limit. The LCS recovery is within limits. This is not expected to significantly impact data quality.

The LCS and LCSD recoveries in fraction 3B (87%, 88%) are just below the method control limit. The MS and MSD are within the method control limits. This is not expected to have a significant impact on data quality.

LOR = Limit of Reporting

LCB = Laboratory Control Blank (limits: <LOR)

LCS = Laboratory Control Sample (limits: solids: 85-115%, stack: 90-110%)

MS = Matrix Spike Sample (limits: 75-125%)

RPD = Relative Percent Difference (limits: <20%)

CCV/CVS = Calibration Verification Standard (limits: 85-115%)

Certified by: \_\_\_\_\_

Whitney Davis  
Account Manager

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# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-5/29-1	P-5/29-2	P-5/29-3	C-5/29-1	C-5/29-2
ALS Sample ID	L1826946-1	L1826946-2	L1826946-3	L1826946-4	L1826946-5
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	29-Aug-16	31-Aug-16	6-Sep-16	6-Sep-16	7-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
<b>Mercury via FIMS CVAA</b>					
Method 29	LOR				
	ug	ug	ug	ug	ug
Analytical Fraction 1B 0.015	<	<	<	<	<
Analytical Fraction 2B 0.050	<	<	<	0.440	0.210
Analytical Fraction 3A 0.005	<	<	<	<	<
Analytical Fraction 3B 0.025	<	<	<	<	<
Analytical Fraction 3C 0.025	<	<	<	0.290	0.448

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-5/29-3	5/29-BLANK
ALS Sample ID	L1826946-6	L1826946-7
Matrix	Stack	Stack
Analysis type	Sample	Sample
Sampling Date/Time	7-Sep-16	8-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16

Mercury via FIMS CVAA		LOR		
	Method 29	ug	ug	ug
Analytical Fraction 1B	0.015	<	<	
Analytical Fraction 2B	0.050	0.490	0.216	
Analytical Fraction 3A	0.005	<	<	
Analytical Fraction 3B	0.025	<	<	
Analytical Fraction 3C	0.025	0.695	<	

# ALS Environmental

## Sample QC Summary Report

Sample Name	LCB	LCS	LCS	LCSD	LCSD
ALS Sample ID	LCB	LCS	LCS	LCSD	LCSD
Analysis type	Method Blank	Blank Spike	Blank Spike	Blank Spike Dup	Blank Spike Dup
Sampling Date/Time	N/A	N/A	N/A	N/A	N/A
Date of Receipt	N/A	N/A	N/A	N/A	N/A
Mercury via FIMS CVAA	LOR				
Method 29	ug	ug	ug	% Rec	ug
					% Rec
Analytical Fraction 1B	0.02	<	0.275	94%	0.262
Analytical Fraction 2B	0.050	<	0.892	91%	0.897
Analytical Fraction 3A	0.01	<	0.0949	97%	0.0956
Analytical Fraction 3B	0.03	<	0.435	87%	0.440
Analytical Fraction 3C	0.03	<	0.487	98%	0.478

# ALS Environmental

## Sample QC Summary Report

Sample Name	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1
ALS Sample ID	L1826946-1	L1826946-1DUP	L1826946-1MS	L1826946-1MS	L1826946-1MSD	L1826946-1MSD
Matrix	Stack	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
Mercury via FIMS CVAA	LOR					
Method 29	ug	ug	ug	% Rec	ug	% Rec
Analytical Fraction 1B 0.015	<	<	0.287	97%	0.288	98%
Analytical Fraction 2B 0.050	<	<	2.76	84%	2.78	84%
Analytical Fraction 3A 0.005	<	<	0.204	99%	0.198	96%
Analytical Fraction 3B 0.025	<	<	0.458	92%	0.452	90%
Analytical Fraction 3C 0.025	<	<	2.43	96%	2.38	94%



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## Certificate of Analysis

ALS Project Contact: Whitney Davis  
ALS Project ID: EQM100  
ALS WO#: L1826946  
Date of Report: 29-Sep-16  
Date of Sample Receipt: 9-Sep-16

Client Name: Environmental Quality Management Inc.  
Client Address: 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
Client Contact: Doug Allen  
Client Project ID: 50074.0172 AK Steel ICR

### COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020A (MC 22-Sep-16)  
Sample Preparation via USEPA Method 29 (NOB 22-Sep-16)

### Fraction 1A Analysis


Antimony was detected in the Laboratory Control Blank. Data may be biased high.

### Fraction 2A Analysis

The Laboratory Control Sample was not spiked and the Laboratory Control Sample Duplicate was double-spiked. There is no expected impact on data quality.

LCB = Laboratory Control Blank  
LCS = Laboratory Control Sample  
LCSD = Laboratory Control Sample Duplicate  
LOR = Limit of Reporting

Certified by: \_\_\_\_\_

  
Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental							
Sample Analysis Summary Report							
Sample Name		P-5/29-1	P-5/29-2	P-5/29-3	C-5/29-1	C-5/29-2	C-5/29-3
ALS Sample ID		L1826946-1	L1826946-2	L1826946-3	L1826946-4	L1826946-5	L1826946-6
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample	Sample	Sample
Sampling Date		29-Aug-16	31-Aug-16	6-Sep-16	6-Sep-16	7-Sep-16	7-Sep-16
Date of Receipt		9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
Multi-Metals via ICP-MS		LOR					
		ug	ug	ug	ug	ug	ug
Front Half HF Fraction 1A							
Antimony	0.2	1.07	<	<	<	<	0.230
Arsenic	1	<	<	<	6.22	7.00	8.42
Beryllium	0.2	<	<	<	<	<	<
Cadmium	0.1	<	<	<	0.100	0.102	0.109
Chromium	1	4.28	2.90	3.06	9.30	13.5	9.87
Cobalt	0.2	<	<	<	<	<	<
Lead	0.5	0.714	0.814	0.677	10.2	6.95	12.4
Manganese	0.5	5.68	5.32	6.24	12.0	10.2	5.03
Nickel	0.2	3.24	3.74	3.07	8.25	12.8	5.78
Selenium	2	<	<	<	<	<	<
Back Half (HNO3 / H2O2) Fraction 2A							
Antimony	0.1	<	<	<	<	1.67	<
Arsenic	0.2	<	<	<	0.940	0.772	1.09
Beryllium	0.1	<	<	<	<	<	<
Cadmium	0.05	<	<	<	<	<	<
Chromium	0.15	17.3	13.6	7.76	10.7	5.98	9.61
Cobalt	0.1	0.307	0.170	0.100	0.221	0.135	0.229
Lead	0.05	0.501	0.311	0.407	0.328	0.454	0.427
Manganese	0.15	6.99	3.00	2.64	2.80	4.22	2.52
Nickel	0.1	18.7	10.4	6.83	11.6	5.76	7.15
Selenium	1	<	<	<	17.0	11.8	12.7

ALS Environmental			
Sample Analysis Summary Report			
Sample Name		5/29-BLANK	
ALS Sample ID		L1826946-7	
Matrix		Stack	
Analysis Type		Sample	
Sampling Date		8-Sep-16	
Date of Receipt		9-Sep-16	
Multi-Metals via ICP-MS		LOR	
		ug	ug
Front Half HF Fraction 1A			
	Antimony	0.2	0.285
	Arsenic	1	<
	Beryllium	0.2	<
	Cadmium	0.1	<
	Chromium	1	<
	Cobalt	0.2	<
	Lead	0.5	<
	Manganese	0.5	1.12
	Nickel	0.2	1.97
	Selenium	2	<
Back Half (HNO3 / H2O2) Fraction 2A			
	Antimony	0.1	<
	Arsenic	0.2	<
	Beryllium	0.1	<
	Cadmium	0.05	<
	Chromium	0.15	0.760
	Cobalt	0.1	<
	Lead	0.05	0.0650
	Manganese	0.15	0.689
	Nickel	0.1	1.03
	Selenium	1	<

# ALS Environmental

## Sample QC Summary Report

Sample Name		LCB	LCS	LCS	LCSD	LCSD
ALS Sample ID		LCB	LCS	LCS	LCSD	LCSD
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis Type		Blank	LCS	LCS	LCS	LCS
Sampling Date		n/a	n/a	n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a	n/a	n/a
<b>Multi-Metals via ICP-MS</b>						
	<b>LOR</b>					
	<b>ug</b>	<b>ug</b>	<b>ug</b>	<b>% Rec</b>	<b>ug</b>	<b>% Rec</b>
<b>Front Half HF Fraction 1A</b>						
Antimony	0.2	1.22	11.8	88	11.6	87
Arsenic	1	<	56.2	93	57.1	95
Beryllium	0.2	<	59.8	100	60.1	100
Cadmium	0.1	<	28.5	95	28.8	96
Chromium	1	<	56.7	94	57.4	96
Cobalt	0.2	<	57.1	95	56.8	95
Lead	0.5	<	59.3	99	59.5	99
Manganese	0.5	<	56.2	94	56.3	94
Nickel	0.2	<	56.8	95	56.9	95
Selenium	2	<	57.4	95	58.6	97
<b>Back Half (HNO3 / H2O2) Fraction 2A</b>						
Antimony	0.1	<	n/a	n/a	5.56	93
Arsenic	0.2	<	n/a	n/a	57.1	95
Beryllium	0.1	<	n/a	n/a	59.6	99
Cadmium	0.05	<	n/a	n/a	28.5	95
Chromium	0.15	<	n/a	n/a	58.8	98
Cobalt	0.1	<	n/a	n/a	58.5	98
Lead	0.05	<	n/a	n/a	61.2	102
Manganese	0.15	<	n/a	n/a	57.5	96
Nickel	0.1	<	n/a	n/a	58.0	97
Selenium	1	<	n/a	n/a	56.2	94

# ALS Environmental

## Sample QC Summary Report

Sample Name	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1	P-5/29-1
ALS Sample ID	L1826946-1	L1826946-1	MS	MS	MSD	MSD
Matrix	Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type	Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
<b>Multi-Metals via ICP-MS</b>						
	<b>LOR</b>					
	<b>ug</b>	<b>ug</b>	<b>ug</b>	<b>ug</b>	<b>% Rec</b>	<b>% Rec</b>
<b>Front Half HF Fraction 1A</b>						
Antimony	0.2	1.07	0.427	21.8	86	22.3
Arsenic	1	<	<	105	87	110
Beryllium	0.2	<	<	109	91	112
Cadmium	0.1	<	<	51.9	86	54.4
Chromium	1	4.28	4.52	118	95	126
Cobalt	0.2	<	<	111	93	116
Lead	0.5	0.714	0.712	119	99	120
Manganese	0.5	5.68	5.78	119	95	127
Nickel	0.2	3.24	3.19	113	92	117
Selenium	2	<	<	105	88	110
<b>Back Half (HNO3 / H2O2) Fraction 2A</b>						
Antimony	0.1	<	<	11.9	99	10.9
Arsenic	0.2	<	<	57.1	95	52.3
Beryllium	0.1	<	<	56.6	94	52.9
Cadmium	0.05	<	<	30.6	102	28.0
Chromium	0.15	17.3	18.5	84.0	111	74.4
Cobalt	0.1	0.307	0.317	64.5	107	57.8
Lead	0.05	0.501	0.520	60.5	100	55.1
Manganese	0.15	6.99	5.76	70.9	106	63.5
Nickel	0.1	18.7	19.6	83.4	108	75.0
Selenium	1	<	<	55.8	92	50.9

**PM<sub>2.5</sub> FILTERABLE AND CONDENSABLE**

**PROJECT ANALYTICAL SHEET** (sheet 1 of 1)

Project Name: <u>AK Middletown ICR</u>				Project No.: <u>050074.0172</u>	
Project Date(s): _____				Project Manager: <u>Allen</u>	
Method(s): <u>201A, 202</u>				No. of Sites: <u>2</u>	

RUN NO.	ID NO.	DESCRIPTION/#	TARE MASS	FINAL MASS	NET MASS
P-202-1	2016-262	Filter 832610	345.75	346.35	0.6
P-202-1	2016-263	Acetone 456	133,306.85	133,308.3	1.45
P-202-2	2016-264	Filter 832594	355.0	355.0	0.0
P-202-2	2016-265	Acetone 457	130,398.85	130,400.7	1.85
P-202-3	2016-266	Filter 832587	344.15	344.45	0.3
P-202-3	2016-267	Acetone 458	133,408.95	133,411.8	2.85
C-PM10-1	2016-268	Filter 470923	112.05	201.0	88.95
C-PM10-1	2016-269	PM>10 459	133,038.65	133,041.95	3.3
C-PM10-1	2016-270	2.5<PM<10 460	134,058.75	134,065.7	6.95
C-PM10-1	2016-271	PM<2.5 461	134,757.75	134,759.4	1.65
C-PM10-2	2016-272	Filter 470920	112.25	176.65	64.4
C-PM10-2	2016-273	PM>10 462	128,123.85	128,130.1	6.25
C-PM10-2	2016-274	2.5<PM<10 463	136,715.10	136,722.85	7.75
C-PM10-2	2016-275	PM<2.5 464	133,982.25	133,982.9	0.65
C-PM10-3	2016-276	Filter 470922	112.0	163.75	51.75
C-PM10-3	2016-277	PM>10 465	132,864.30	132,873.0	8.7
C-PM10-3	2016-278	2.5<PM<10 466	128,362.60	128,369.3	6.7
C-PM10-3	2016-279	PM<2.5 467	139,333.15	139,336.75	3.6
BLANK	2016-280	Filter 832568	337.95	345.5	7.55
BLANK	2016-281	Acetone 468	131,214.25	131,214.35	0.1
BLANK	2016-282	Filter 470921	112.15	112.15	0.0

## PROJECT ANALYTICAL SHEET

Site: <u>AK Mattetavn ICR</u>		Run No.: <u>P-202-1</u>	
Filter No.: <u>832610</u>		I.D. No.: <u>2016-262</u>	
Final Mass:		Tare Mass: <u>345.75</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:37</u>	<u>EZ</u>	<u>346.3</u>	
#2 <u>10/7/16 0650</u>	<u>BF</u>	<u>346.4</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>346.35</u>	
Comments:		Net Gain: <u>0.6</u>	
F/H Beaker No.: <u>456</u>		I.D. No.: <u>2016-263</u>	
Final Mass:		Tare Mass: <u>133,306.85</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:52</u>	<u>EZ</u>	<u>133,308.4</u>	
#2 <u>10/7/16 0650</u>	<u>BF</u>	<u>133,308.2</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>133,308.3</u>	
Comments:		Net Gain: <u>1.45</u>	
B/H Beaker No.: _____		I.D. No.: _____	
Final Mass:		Tare Mass: _____	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 _____	_____	_____	
#2 _____	_____	_____	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: _____	
Comments:		Net Gain: _____	

## PROJECT ANALYTICAL SHEET

Site: <u>AK Midtown ICR</u>		Run No.: <u>P-202-2</u>	
Filter No.: <u>832594</u>		I.D. No.: <u>2016-264</u>	
Final Mass:		Tare Mass: <u>355.0</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:38</u>	<u>E2</u>	<u>355.0</u>	
#2 <u>10/7/16 0651</u>	<u>BF</u>	<u>355.0</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>355.0</u>	
Comments:		Net Gain: <u>0.0</u>	
F/H Beaker No.: <u>457</u>		I.D. No.: <u>2016-265</u>	
Final Mass:		Tare Mass: <u>130,398.85</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:53</u>	<u>E2</u>	<u>130,400.8</u>	
#2 <u>10/7/16 0651</u>	<u>BF</u>	<u>130,400.6</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>130,400.7</u>	
Comments:		Net Gain: <u>1.85</u>	
B/H Beaker No.: _____		I.D. No.: _____	
Final Mass:		Tare Mass: _____	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 _____	_____	_____	
#2 _____	_____	_____	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: _____	
Comments:		Net Gain: _____	

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middletown ICR</u>		Run No.: <u>P-202-3</u>	
Filter No.: <u>832587</u>		I.D. No.: <u>3 2016-266</u>	
Final Mass:		Tare Mass: <u>344.15</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:41</u>	<u>E2</u>	<u>344.3</u>	
#2 <u>10/7/16 0652</u>	<u>BF</u>	<u>344.6</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>344.45</u>	
Comments:		Net Gain: <u>0.3</u>	
F/H Beaker No.: <u>458</u>		I.D. No.: <u>2016-267</u>	
Final Mass:		Tare Mass: <u>133,408.95</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:55</u>	<u>E2</u>	<u>133,412.0</u>	
#2 <u>10/7/16 0652</u>	<u>BF</u>	<u>133,411.6</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>133,411.8</u>	
Comments:		Net Gain: <u>133.4 2.85</u>	
B/H Beaker No.: _____		I.D. No.: _____	
Final Mass:		Tare Mass: _____	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 _____	_____	_____	
#2 _____	_____	_____	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: _____	
Comments:		Net Gain: _____	

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middletown ICR</u>		Run No.: <u>C-PM10-1</u>	
Filter No.: <u>470923</u>		I.D. No.: <u>2016-268</u>	
Final Mass:		Tare Mass: <u>112.05</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:47</u>	<u>EZ</u>	<u>201.0</u>	
#2 <u>10/7/16 0653</u>	<u>BF</u>	<u>201.0</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>201.0</u>	
Comments:		Net Gain: <u>88.95</u>	
PM>10 Beaker No.: <u>459</u>		I.D. No.: <u>2016-269</u>	
Final Mass:		Tare Mass: <u>133,038.65</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:56</u>	<u>EZ</u>	<u>133,042.2</u>	
#2 <u>10/7/16 0653</u>	<u>BF</u>	<u>133,041.7</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>133,041.95</u>	
Comments:		Net Gain: <u>3.3</u>	
2.5<PM<10 Beaker No.: <u>2 460</u>		I.D. No.: <u>2016-270</u>	
Final Mass:		Tare Mass: <u>134,058.75</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:56</u>	<u>EZ</u>	<u>134,065.9</u>	
#2 <u>10/7/16 0654</u>	<u>BF</u>	<u>134,065.5</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>134,065.7</u>	
Comments:		Net Gain: <u>6.95</u>	

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middleton ICR</u>	Run No.: <u>C-R410-1</u>
PM<2.5 Beaker No.: <u>461</u>	I.D. No.: <u>2016-271</u>
Final Mass:	Tare Mass: <u>134,751.75</u>
<u>Date/Time</u>	<u>Name</u> <u>Mass</u>
#1 <u>10/6/16 16:57</u>	<u>EZ</u> <u>134,759.5</u>
#2 <u>10/7/16 0654</u>	<u>Bi=</u> <u>134,759.3</u>
#3 _____	_____
#4 _____	_____
	Avg. Mass: <u>134,759.4</u>
Comments:	Net Gain: <u>1.65</u>
B/H Beaker No.: _____	I.D. No.: _____
Final Mass:	Tare Mass: _____
<u>Date/Time</u>	<u>Name</u> <u>Mass</u>
#1 _____	_____
#2 _____	_____
#3 _____	_____
#4 _____	_____
	Avg. Mass: _____
Comments:	Net Gain: _____
B/H Beaker No.: _____	I.D. No.: _____
Final Mass:	Tare Mass: _____
<u>Date/Time</u>	<u>Name</u> <u>Mass</u>
#1 _____	_____
#2 _____	_____
#3 _____	_____
#4 _____	_____
	Avg. Mass: _____
Comments:	Net Gain: _____

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middletown ICR</u>		Run No.: <u>C-P410-2</u>	
Filter No.: <u>470920</u>		I.D. No.: <u>2016-272</u>	
Final Mass:		Tare Mass: <u>112.25</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:43</u>	<u>EZ</u>	<u>176.9</u>	
#2 <u>10/7/16 0655</u>	<u>BF</u>	<u><del>176.4</del> BF 176.4</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>176.65</u>	
Comments:		Net Gain: <u>64.4</u>	
PM>10 Beaker No.: <u>462</u>		I.D. No.: <u>2016-273</u>	
Final Mass:		Tare Mass: <u>128,123.85</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:57</u>	<u>EZ</u>	<u>128,130.3</u>	
#2 <u>10/7/16 0655</u>	<u>BF</u>	<u>128,129.9</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>128,130.1</u>	
Comments:		Net Gain: <u>6.25</u>	
2.5<PM<10 Beaker No.: <u>463</u>		I.D. No.: <u>2016-274</u>	
Final Mass:		Tare Mass: <u>136,715.10</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:58</u>	<u>EZ</u>	<u>136,723.0</u>	
#2 <u>10/7/16 0656</u>	<u>BF</u>	<u>136,722.7</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>136,722.85</u>	
Comments:		Net Gain: <u>7.75</u>	

### PROJECT ANALYTICAL SHEET

Site: <u>AK Middleton ICR</u>		Run No.: <u>C-P410-2</u>	
PM<2.5 Beaker No.: <u>464</u>		I.D. No.: <u>2016-275</u>	
Final Mass:		Tare Mass: <u>133,982.25</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:59</u>	<u>E2</u>	<u>133,983.1</u>	
#2 <u>10/7/16 0656</u>	<u>BF</u>	<u>133,982.7</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>133,982.9</u>	
Comments:		Net Gain: <u>0.65</u>	
B/H Beaker No.: _____		I.D. No.: _____	
Final Mass:		Tare Mass: _____	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 _____	_____	_____	
#2 _____	_____	_____	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: _____	
Comments:		Net Gain: _____	
B/H Beaker No.: _____		I.D. No.: _____	
Final Mass:		Tare Mass: _____	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 _____	_____	_____	
#2 _____	_____	_____	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: _____	
Comments:		Net Gain: _____	

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middletown ICR</u>		Run No.: <u>CPMB-3</u>	
Filter No.: <u>470922</u>		I.D. No.: <u>2016-276</u>	
Final Mass:		Tare Mass: <u>112.0</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:50</u>	<u>EZ</u>	<u>164.0</u>	
#2 <u>10/7/16 0657</u>	<u>BF</u>	<u>163.5</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>163.75</u>	
Comments:		Net Gain: <u>51.75</u>	
PM>10 Beaker No.: <u>465</u>		I.D. No.: <u>2016-277</u>	
Final Mass:		Tare Mass: <u>132,864.30</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 16:59</u>	<u>EZ</u>	<u>132,873.1</u>	
#2 <u>10/7/16 0657</u>	<u>BF</u>	<u>132,872.9</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>132,873.0</u>	
Comments:		Net Gain: <u>8.7</u>	
2.5<PM<10 Beaker No.: <u>466</u>		I.D. No.: <u>2016-278</u>	
Final Mass:		Tare Mass: <u>128,362.60</u>	
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>	
#1 <u>10/6/16 17:00</u>	<u>EZ</u>	<u>128,369.5</u>	
#2 <u>10/7/16 0658</u>	<u>BF</u>	<u>128,369.1</u>	
#3 _____	_____	_____	
#4 _____	_____	_____	
		Avg. Mass: <u>128,369.3</u>	
Comments:		Net Gain: <u>6.7</u>	

**PROJECT ANALYTICAL SHEET**

Site: <u>AK Middletown</u>		Run No.: <u>C-PM10-3</u>
PM<2.5 Beaker No.: <u>467</u>		I.D. No.: <u>2016-279</u>
Final Mass:		Tare Mass: <u>139,333.15</u>
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>
#1 <u>10/6/16 17:01</u>	<u>E2</u>	<u>139,337.0</u>
#2 <u>10/7/16 0658</u>	<u>BF</u>	<u>139,336.5</u>
#3 _____	_____	_____
#4 _____	_____	_____
		Avg. Mass: <u>139,336.75</u>
Comments:		Net Gain: <u>3.6</u>
B/H Beaker No.: _____		I.D. No.: _____
Final Mass:		Tare Mass: _____
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>
#1 _____	_____	_____
#2 _____	_____	_____
#3 _____	_____	_____
#4 _____	_____	_____
		Avg. Mass: _____
Comments:		Net Gain: _____
B/H Beaker No.: _____		I.D. No.: _____
Final Mass:		Tare Mass: _____
<u>Date/Time</u>	<u>Name</u>	<u>Mass</u>
#1 _____	_____	_____
#2 _____	_____	_____
#3 _____	_____	_____
#4 _____	_____	_____
		Avg. Mass: _____
Comments:		Net Gain: _____

**PROJECT ANALYTICAL SHEET**

BLANK ANALYSIS			
Filter No.: <u>832588</u>		I.D. No.: <u>2016-280</u>	
Final Mass:		Tare Mass: <u>337.95</u>	
Date/Time	Name	Mass	
#1 <u>10/6/16</u> <u>16:44</u>	<u>EZ</u>	<u>345.5</u>	
#2 <u>10/7/16</u> <u>0659</u>		<u>345.5</u>	
#3			
#4			
		Avg. Mass: <u>345.5</u>	
		Net Gain: <u>7.55</u>	
Acetone Beaker No.: <u>468</u>		I.D. No.: <u>2016-281</u>	
Final Mass:		Tare Mass: <u>131,214.25</u>	
Date/Time	Name	Mass	
#1 <u>10/6/16</u> <u>17:01</u>	<u>EZ</u>	<u>131,214.3</u>	
#2 <u>10/7/16</u> <u>0659</u>		<u>131,214.4</u>	
#3			
#4			
		Avg. Mass: <u>131,214.35</u>	
		Net Gain: <u>0.1</u>	
<del>DI Water Beaker</del> No.: <u>470921</u>		I.D. No <u>2016-282</u>	
<del>Filter</del>		Tare Mass: <u>112.15</u>	
Final Mass:			
Date/Time	Name	Mass	
#1 <u>10/6/16</u> <u>16:45</u>	<u>EZ</u>	<u>112.2</u>	
#2 <u>10/7/16</u> <u>0659</u>	<u>BF</u>	<u>112.1</u>	
#3			
#4			
		Avg. Mass: <u>112.15</u>	
		Net Gain: <u>0.0</u>	



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
Phone: 905-331-3111, FAX: 905-331-4567

## Certificate of Analysis

ALS Project Contact: Whitney Davis

ALS Project ID: EQM100

ALS WO#: L1827087

Date of Report: 3-Oct-16

Date of Sample Receipt: 9-Sep-16

Client Name: ENVIRONMENTAL QUALITY MANAGEMENT INC.

Client Address: 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States

Client Contact: Doug Allen

Client Project ID: 50074.0172 AK STEEL ICR

### COMMENTS:


Sample Particulate Analysis via Gravimetric USEPA Method 202 (SA 03-Oct-2016)

LCB = Laboratory Control Blank

CVS = Continuing Verification Standard Sample (limits:  $\pm 2$  in the last decimal)

LOR = Limit of Reporting

Certified by: \_\_\_\_\_

  
Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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# ALS Environmental

## Sample Analysis Summary Report

Sample Name		P-202-1	P-202-2	P-202-3	C-202-1	C-202-2
ALS Sample ID		L1827087-1	L1827087-2	L1827087-3	L1827087-4	L1827087-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		29-Aug-16	31-Aug-16	6-Sep-16	6-Sep-16	7-Sep-16
Date of Receipt		9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
PM via Gravimetric Analysis						
Method 202	LOR					
	mg	mg	mg	mg	mg	mg
Extractable Condensible Particulates	0.4	3.5	3.7	3.8	4.9	4.4
Non-Extractable Condensible Particulates	0.4	1.1	1.1	5.6	29.7	25.5
	g	g	g	g	g	g
Water Mass	0.02	227	215	221	159	190

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-202-3	202 BLANK
ALS Sample ID	L1827087-6	L1827087-7
Matrix	Stack	Stack
Analysis type	Sample	Sample
Sampling Date/Time	7-Sep-16	7-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16
PM via Gravimetric Analysis Method 202	LOR mg	mg
Extractable Condensible Particulates	0.4	13.2
Non-Extractable Condensible Particulates	0.4	65.0
	g	g
Water Mass	0.02	289
		96.8

## **HYDROGEN SULFIDE**



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F: +1 805 526 7270  
[www.alsglobal.com](http://www.alsglobal.com)

## LABORATORY REPORT

August 25, 2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Blvd.  
Cincinnati, OH 45240

**RE: AK Middletown ICR / 050074.0172**

Dear Doug:

Enclosed are the results of the sample submitted to our laboratory on August 24, 2016. For your reference, this analysis has been assigned our service request number P1604118.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

**ALS | Environmental**

*Kate Kaneko*  
By Kate Kaneko at 1:49 pm, 08/25/16

Kate Kaneko  
Project Manager



2655 Park Center Dr., Suite A  
Simi Valley, CA 93065  
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F: +1 805 526 7270  
[www.alsglobal.com](http://www.alsglobal.com)

Client: Environmental Quality Management  
Project: AK Middletown ICR / 050074.0172

Service Request No: P1604118

---

### CASE NARRATIVE

The sample was received intact under chain of custody on August 24, 2016 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

#### Hydrogen Sulfide Analysis

The sample was analyzed for hydrogen sulfide per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan. This method is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP or AIHA-LAP, LLC accreditation.

---

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>	101661
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0694
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Florida DOH (NELAP)	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E871020
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm">http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm</a>	2014025
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	977273
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-003
Pennsylvania DEP	<a href="http://www.depweb.state.pa.us/labs">http://www.depweb.state.pa.us/labs</a>	68-03307 (Registration)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704413- 16-7
Utah DOH (NELAP)	<a href="http://www.health.utah.gov/lab/labimp/certification/index.html">http://www.health.utah.gov/lab/labimp/certification/index.html</a>	CA01627201 6-6
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at [www.alsglobal.com](http://www.alsglobal.com), or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

## ALS ENVIRONMENTAL

### DETAIL SUMMARY REPORT

Client: Environmental Quality Management  
Project ID: AK Middletown ICR / 050074.0172

Service Request: P1604118

Date Received: 8/24/2016  
Time Received: 09:50

ASTM D 5504-12 - H2S Bag

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected
P-15-1	P1604118-001	Air	8/23/2016	00:00

X



Environmental Quality Management, Inc.

Environmental Quality Management, Inc.

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project Name AK MIDDLETOWN ICR  
Project Number 050074.0172  
Project Manager ALLEN  
Sample Team Leader ALLEN

Lab Destination ALS  
Lab Contact/Phone 050074.0172  
Lab Purchase Order No. 050074.0172  
Carrier/Waybill No.

Reference Document No. N  
Page 1 of 1  
Report to: Doug Allen D Allen @ EQM.com  
1800 Carillon Blvd  
Cincinnati, OH 45240  
(513) 825-7500

Bill to:

SAME

## ONE CONTAINER PER LINE

Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Analytical Method/(Parameters)	Condition of Receipt (Lab)
P-15-1	BAG SAMPLE	8/24/16	BAG	~.75 L	N/A	EPA METHOD 15 H <sub>2</sub> S	

Special Instructions:

Possible Hazard Identification:

Non-hazardous ☒ Flammable ☐ Skin Irritant ☐ Other ☐

Turnaround Time Required:

Normal ☐ Rush ☒ Results Required by 1 DAY TAT

1. Relinquished by

(Signature/Affiliation) [Signature]

2. Relinquished by

(Signature/Affiliation) [Signature]

Comments:

Sample Disposal:

Return to Client ☐ Disposal by Lab ☒ Archive ☐ (mo.)

QA Requirements:

1. Received by

(Signature/Affiliation) [Signature]

2. Received by

(Signature/Affiliation) [Signature]

Date: 8/24/16

Time: 0950

Date: 8/24/16

Time: 0950

N:\Forms\Forms\Emission Testing\Chain of Custody.doc

Client: <u>Environmental Quality Management</u>	Work order: <u>P1604118</u>
Project: <u>AK Middletown ICR / 050074.0172</u>	
Sample(s) received on: <u>8/24/16</u>	Date opened: <u>8/24/16</u> by: <u>KKELPE</u>

		Yes	No	N/A
1	Were <b>sample containers</b> properly marked with client sample ID?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Did <b>sample containers</b> arrive in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Were <b>chain-of-custody</b> papers used and filled out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Did <b>sample container labels</b> and/or tags agree with custody papers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Was <b>sample volume</b> received adequate for analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Are samples within specified holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Was proper <b>temperature</b> (thermal preservation) of cooler at receipt adhered to?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Were <b>custody seals</b> on outside of cooler/Box/Container?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Do containers have appropriate <b>preservation</b> , according to method/SOP or Client specified information?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Is there a client indication that the submitted samples are <b>pH</b> preserved?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Were <b>VOA vials</b> checked for presence/absence of air bubbles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	<b>Tubes:</b> Are the tubes capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11	<b>Badges:</b> Are the badges properly capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Are dual bed badges separated and individually capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

[illegible]

RSK - MEEPP, HCL (pH<2); RSK - CO<sub>2</sub>, (pH 5-8); Sulfur (pH>4)

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Project ID:** AK Middletown ICR / 050074.0172

ALS Project ID: P1604118

### Hydrogen Sulfide

**Test Code:** ASTM D 5504-12  
**Instrument ID:** Agilent 7890A/GC22/SCD  
**Analyst:** Mike Conejo  
**Sample Type:** 1 L Zefon Bag(s)  
**Test Notes:**

**Date(s) Collected:** 8/23/16  
**Date Received:** 8/24/16  
**Date Analyzed:** 8/24/16

Client Sample ID	ALS Sample ID	Injection		Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
		Volume ml(s)	Time Analyzed					
P-15-1	P1604118-001	0.10	10:35	ND	70	ND	50	
Method Blank	P160824-MB	1.0	08:05	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Sample ID:** Lab Control Sample  
**Client Project ID:** AK Middletown ICR / 050074.0172

ALS Project ID: P1604118  
ALS Sample ID: P160824-LCS

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 7890A/GC22/SCD  
Analyst: Mike Conejo  
Sample Type: 1 L Zefon Bag  
Test Notes:

Date Collected: NA  
Date Received: NA  
Date Analyzed: 8/24/16  
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,000	984	98	75-148	



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[www.alsglobal.com](http://www.alsglobal.com)

## LABORATORY REPORT

August 26, 2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Blvd.  
Cincinnati, OH 45240

**RE: AK Steel ICR / 050074.0172**

Dear Doug:

Enclosed are the results of the sample submitted to our laboratory on August 25, 2016. For your reference, these analyses have been assigned our service request number P1604137.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

**ALS | Environmental**

*Kate Kaneko*  
By Kate Kaneko at 1:56 pm, 08/26/16

Kate Kaneko  
Project Manager



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F: +1 805 526 7270  
[www.alsglobal.com](http://www.alsglobal.com)

Client: Environmental Quality Management  
Project: AK Steel ICR / 050074.0172

Service Request No: P1604137

### CASE NARRATIVE

The sample was received intact under chain of custody on August 25, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

#### Hydrogen Sulfide Analysis

The sample was analyzed for hydrogen sulfide per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). Method ASTM D 5504-12 is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP or AIHA-LAP, LLC accreditation.

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[www.alsglobal.com](http://www.alsglobal.com)

# ALS Environmental – Simi Valley

## CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>	101661
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0694
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Florida DOH (NELAP)	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E871020
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm">http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm</a>	2014025
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	977273
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-003
Pennsylvania DEP	<a href="http://www.depweb.state.pa.us/labs">http://www.depweb.state.pa.us/labs</a>	68-03307 (Registration)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704413- 16-7
Utah DOH (NELAP)	<a href="http://www.health.utah.gov/lab/labimp/certification/index.html">http://www.health.utah.gov/lab/labimp/certification/index.html</a>	CA01627201 6-6
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at [www.alsglobal.com](http://www.alsglobal.com), or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

# ALS ENVIRONMENTAL

## DETAIL SUMMARY REPORT

Client: Environmental Quality Management  
Project ID: AK Steel ICR / 050074.0172

Service Request: P1604137

Date Received: 8/25/2016  
Time Received: 09:35

ASTM D 5504-12 - H2S Bag  
X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
P-15-2	P1604137-001	Air	8/24/2016	00:00	X



Environmental Quality Management, Inc.

Environmental Quality Management, Inc.

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project Name AK STEEL ICR  
Project Number 050074.0172  
Project Manager ALLEN  
Sample Team Leader ALLEN

Lab Destination ALS  
Lab Contact/Phone 21799  
Lab Purchase Order No. 21799  
Carrier/Waybill No. 21799

Reference Document No. 1  
Page 1 of 1  
Report to: Doug Allen DAllen@eqm.com  
1800 Carillon Blvd  
Cincinnati Ohio 45240  
513 825 7500  
Bill to: SAME

## ONE CONTAINER PER LINE

Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Analytical Method/(Parameters)	Condition of Receipt (Lab)
<u>P-15-2</u>	<u>BAG SAMPLE</u>	<u>8/24/16</u>	<u>BAG</u>	<u>~.75L</u>	<u>NA</u>	<u>EPA METHOD 15 H<sub>2</sub>S</u>	
Special Instructions:							

Possible Hazard Identification:

Non-hazardous ☒ Flammable ☐ Skin Irritant ☐ Other ☐

Sample Disposal:

Return to Client ☐ Disposed by Lab ☒ Archive ☐ (mo.)

## QA Requirements:

Turnaround Time Required: 1 DAY TAT

1. Requisitioned by [Signature] Date: 8/24/16 Time: 4:15 PM

2. Requisitioned by [Signature] Date: 8/25/16 Time: 0925

Comments:

N:\Form\Forms\Emission Testing\Chain of Custody.doc



# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Environmental Quality Management

**Client Project ID:** AK Steel ICR / 050074.0172

ALS Project ID: P1604137

### Hydrogen Sulfide

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 6890A/GC13/SCD  
Analyst: Mike Conejo  
Sample Type: 1 L Zefon Bag(s)  
Test Notes:

Date(s) Collected: 8/24/16  
Date Received: 8/25/16  
Date Analyzed: 8/25/16

Client Sample ID	ALS Sample ID	Injection	Time Analyzed	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
		Volume ml(s)						
P-15-2	P1604137-001	1.0	15:10	16	7.0	12	5.0	
Method Blank	P160825-MB	1.0	07:59	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

### LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Sample ID:** Lab Control Sample  
**Client Project ID:** AK Steel ICR / 050074.0172

ALS Project ID: P1604137  
ALS Sample ID: P160825-LCS

**Test Code:** ASTM D 5504-12  
**Instrument ID:** Agilent 6890A/GC13/SCD  
**Analyst:** Mike Conejo  
**Sample Type:** 1 L Zefon Bag  
**Test Notes:**

**Date Collected:** NA  
**Date Received:** NA  
**Date Analyzed:** 8/25/16  
**Volume(s) Analyzed:** NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,000	953	95	75-148	



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## LABORATORY REPORT

August 29, 2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Blvd.  
Cincinnati, OH 45240

RE: AK Middletown / 050074.0172

Dear Doug:

Enclosed are the results of the sample submitted to our laboratory on August 26, 2016. For your reference, these analyses have been assigned our service request number P1604158.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Kaneko at 12:41 pm, 08/29/16

Kate Kaneko  
Project Manager



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[www.alsglobal.com](http://www.alsglobal.com)

Client: Environmental Quality Management  
Project: AK Middletown / 050074.0172

Service Request No: P1604158

## CASE NARRATIVE

The sample was received intact under chain of custody on August 26, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

### Hydrogen Sulfide Analysis

The sample was analyzed for hydrogen sulfide per modified SCAQMD Method 307-91 and ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). Method ASTM D 5504-12 is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP or AIHA-LAP, LLC accreditation. Method SCAQMD 307-91 is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP, LLC accreditation.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



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[www.alsglobal.com](http://www.alsglobal.com)

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>	101661
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0694
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Florida DOH (NELAP)	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E871020
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm">http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm</a>	2014025
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	977273
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-003
Pennsylvania DEP	<a href="http://www.depweb.state.pa.us/labs">http://www.depweb.state.pa.us/labs</a>	68-03307 (Registration)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704413- 16-7
Utah DOH (NELAP)	<a href="http://www.health.utah.gov/lab/labimp/certification/index.html">http://www.health.utah.gov/lab/labimp/certification/index.html</a>	CA01627201 6-6
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at [www.alsglobal.com](http://www.alsglobal.com), or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

# ALS ENVIRONMENTAL

## DETAIL SUMMARY REPORT

Client: Environmental Quality Management  
Project ID: AK Middletown / 050074.0172

Service Request: P1604158

Date Received: 8/26/2016  
Time Received: 09:50

ASTM D 5504-12 - H2S Bag  
X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
P-15-3	P1604158-001	Air	8/25/2016	00:00	X



EQ

Project Name AK MIDDLETOWN  
Project Number 050074.0172  
Project Manager ALLEN  
Sample Team Leader ALLEN

Reference Document No. 5  
Page 1 of 1  
Report to: DOUG ALLEN DALLMAN CON  
1800 CARILLON BLVD  
CINCINNATI OH 45240  
(513) 825-7500  
Bill to:  
Lab Destination  
Lab Contact/Phone  
Lab Purchase Order No.  
Carrier/Waybill No.

Reference Document No. 1  
Page 1 of 1

Report to: Dave A

Lab Purchase Order No. 21199  
 . Carrier/Waybill No.

**Bill 10**

SAME

ONE CONTAINER PER LINE							
Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Analytical Method/(Parameters)	Condition of Receipt (Lab)
P-15-3	BAG SAMPLE	8/25/16	BAG	~.75L	N/A	GLA METHOD 15 ' H <sub>2</sub> S	

Special Instructions:

### Possible Hazard Identification:

Non-hazardous ☒ Flammable ☐ Skin Irritant ☐ Other ☐

**Turnaround Time Required;**

Normal II Rust ~~IX~~ Results Required by 1 DAY TAT

1. Relinquished by Edna  
(Signature/Initials)  
Date: 8/25/16  
Time: 16:15

2. Relinquished by \_\_\_\_\_  
Signature/Amfission)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

## Comments:

N:\Forums\Turns\Emission Testing\Chain of Custody.doc

# **ALS Environmental Sample Acceptance Check Form**

Client: Environmental Quality Management

Work order: P1604158

Project: AK Middletown / 050074.0172

Sample(s) received on: 8/26/2016

Date opened: 8/26/2016

by: ADAVID

**Note:** This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

- |   | <b>Yes</b>                          | <b>No</b>                           | <b>N/A</b>                          |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 Were <b>sample containers</b> properly marked with client sample ID?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 2 Did <b>sample containers</b> arrive in good condition?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3 Were <b>chain-of-custody</b> papers used and filled out?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 4 Did <b>sample container labels</b> and/or tags agree with custody papers?                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5 Was <b>sample volume</b> received adequate for analysis?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 6 Are samples within specified holding times?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 7 Was proper <b>temperature</b> (thermal preservation) of cooler at receipt adhered to?                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8 Were <b>custody seals</b> on outside of cooler/Box/Container?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Location of seal(s) _____ Sealing Lid?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were signature and date included?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were seals intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9 Do containers have appropriate <b>preservation</b> , according to method/SOP or Client specified information? | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Is there a client indication that the submitted samples are <b>pH</b> preserved?                                | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were <b>VOA vials</b> checked for presence/absence of air bubbles?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10 <b>Tubes:</b> Are the tubes capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11 <b>Badges:</b> Are the badges properly capped and intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Are dual bed badges separated and individually capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1604158-001.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): \_\_\_\_\_

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Project ID:** AK Middletown / 050074.0172

ALS Project ID: P1604158

### Hydrogen Sulfide

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 7890A/GC22/SCD  
Analyst: Mike Conejo  
Sample Type: 1 L Zefon Bag(s)  
Test Notes:

Date(s) Collected: 8/25/16  
Date Received: 8/26/16  
Date Analyzed: 8/26/16

Client Sample ID	ALS Sample ID	Injection	Time Analyzed	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
		Volume ml(s)						
P-15-3	P1604158-001	1.0	10:29	ND	7.0	ND	5.0	
Method Blank	P160826-MB	1.0	08:11	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

### LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Sample ID:** Lab Control Sample  
**Client Project ID:** AK Middletown / 050074.0172

ALS Project ID: P1604158  
ALS Sample ID: P160826-LCS

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 7890A/GC22/SCD  
Analyst: Mike Conejo  
Sample Type: 1 L Zefon Bag  
Test Notes:

Date Collected: NA  
Date Received: NA  
Date Analyzed: 8/26/16  
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,000	996	100	75-148	



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## LABORATORY REPORT

August 31, 2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Blvd.  
Cincinnati, OH 45240

RE: AK Middletown / 050074.0172

Dear Doug:

Enclosed are the results of the samples submitted to our laboratory on August 30, 2016. For your reference, these analyses have been assigned our service request number P1604191.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Kaneko at 11:19 am, 08/31/16

Kate Kaneko  
Project Manager



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[www.alsglobal.com](http://www.alsglobal.com)

Client: Environmental Quality Management  
Project: AK Middletown / 050074.0172

Service Request No: P1604191

## CASE NARRATIVE

The samples were received intact under chain of custody on August 30, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

### Hydrogen Sulfide Analysis

The samples were analyzed for hydrogen sulfide per modified SCAQMD Method 307-91 and ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). Method ASTM D 5504-12 is included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP or AIHA-LAP, LLC accreditation. Method SCAQMD 307-91 is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP, LLC accreditation.

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



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[www.alsglobal.com](http://www.alsglobal.com)

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>	101661
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0694
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Florida DOH (NELAP)	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E871020
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm">http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm</a>	2014025
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	977273
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-003
Pennsylvania DEP	<a href="http://www.depweb.state.pa.us/labs">http://www.depweb.state.pa.us/labs</a>	68-03307 (Registration)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704413- 16-7
Utah DOH (NELAP)	<a href="http://www.health.utah.gov/lab/labimp/certification/index.html">http://www.health.utah.gov/lab/labimp/certification/index.html</a>	CA01627201 6-6
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at [www.alsglobal.com](http://www.alsglobal.com), or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

# ALS ENVIRONMENTAL

## DETAIL SUMMARY REPORT

Client: Environmental Quality Management  
Project ID: AK Middletown / 050074.0172

Service Request: P1604191

Date Received: 8/30/2016  
Time Received: 07:45

ASTM D 5504-12 - H2S Bag

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
C-15-1	P1604191-001	Air	8/29/2016	00:00	X
C-15-2	P1604191-002	Air	8/29/2016	00:00	X
C-15-3	P1604191-003	Air	8/29/2016	00:00	X



Environmental Quality Management, Inc.

Environmental Quality Management, Inc.

# ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project Name: AK MIDDLETOWN  
Project Number: 050074.0172  
Project Manager: ALLEN  
Sample Team Leader: ALLEN

Lab Destination: ACS  
Lab Contact/Phone: 2199  
Lab Purchase Order No.: 2199  
Carrier/Waybill No.:

Reference Document No. N  
Page 1 of 1  
Report to: DOUG ALLEN DALE@ERH.COM  
1800 CARILLON BLVD  
CINCINNATI OH 45240  
(513) 825-7500

Bill to:

SAME

## ONE CONTAINER PER LINE

Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Analytical Method/(Parameters)	Condition of Receipt (Lab)
C-15-1	BAG SAMPLE	8/29/16	BAG	~0.75L	N/A	US EPA METHOD 15	
C-15-2							
C-15-3							

Special Instructions:

Possible Hazard Identification:

Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Other

Sample Disposal:

Return to Client ☐ Dispose by Lab ☐ Archive (mos.)

Turnaround Time Required:

Normal ☐ Rush ☒ Results Required by 1 DAY TAT

QA Requirements:

1. Relinquished by

(Signature/Affiliation)

Date: 8/29/16

Time: 1530

2. Relinquished by

(Signature/Affiliation)

Date:

Time:

1. Received by

(Signature/Affiliation)

Date:

Time:

2. Received by

(Signature/Affiliation)

Date:

Time:

Comments:

N:\Forms\Forms\Emission Testing\Chain of Custody.doc

**ALS Environmental  
Sample Acceptance Check Form**

Client: Environmental Quality Management Work order: P1604191  
 Project: AK Middletown / 050074.0172  
 Sample(s) received on: 8/30/16 Date opened: 8/30/16 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

- |   | <u>Yes</u>                          | <u>No</u>                           | <u>N/A</u>                          |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 Were <b>sample containers</b> properly marked with client sample ID?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 2 Did <b>sample containers</b> arrive in good condition?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3 Were <b>chain-of-custody</b> papers used and filled out?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 4 Did <b>sample container labels</b> and/or tags agree with custody papers?                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5 Was <b>sample volume</b> received adequate for analysis?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 6 Are samples within specified holding times?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 7 Was proper <b>temperature</b> (thermal preservation) of cooler at receipt adhered to?                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8 Were <b>custody seals</b> on outside of cooler/Box/Container?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Location of seal(s)? _____ Sealing Lid?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were signature and date included?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were seals intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9 Do containers have appropriate <b>preservation</b> , according to method/SOP or Client specified information? | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Is there a client indication that the submitted samples are <b>pH</b> preserved?                                | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were <b>VOA vials</b> checked for presence/absence of air bubbles?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10 <b>Tubes:</b> Are the tubes capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11 <b>Badges:</b> Are the badges properly capped and intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Are dual bed badges separated and individually capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1604191-001.01	1 L Zefon Bag					
P1604191-002.01	1 L Zefon Bag					
P1604191-003.01	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): \_\_\_\_\_  
 Absence of collection times on chain of custody or bags. \_\_\_\_\_

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

## ALS ENVIRONMENTAL

### RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Environmental Quality Management  
**Client Project ID:** AK Middletown / 050074.0172

ALS Project ID: P1604191

### Hydrogen Sulfide

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 6890A/GC13/SCD  
Analyst: Mike Conejo  
Sample Type: 1 L Zefon Bag(s)  
Test Notes:

Date(s) Collected: 8/29/16  
Date Received: 8/30/16  
Date Analyzed: 8/30/16

Client Sample ID	ALS Sample ID	Injection		Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result $\text{ppbV}$	MRL $\text{ppbV}$	Data Qualifier
		Volume ml(s)	Time Analyzed					
C-15-1	P1604191-001	1.0	08:45	8.5	7.0	6.1	5.0	
C-15-2	P1604191-002	1.0	09:04	22	7.0	16	5.0	
C-15-3	P1604191-003	1.0	09:22	68	7.0	49	5.0	
Method Blank	P160830-MB	1.0	08:07	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

## ALS ENVIRONMENTAL

### LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Environmental Quality Management

**Client Sample ID:** Lab Control Sample

**Client Project ID:** AK Middletown / 050074.0172

ALS Project ID: P1604191

ALS Sample ID: P160830-LCS

**Test Code:** ASTM D 5504-12

**Instrument ID:** Agilent 6890A/GC13/SCD

**Analyst:** Mike Conejo

**Sample Type:** 1 L Zefon Bag

**Test Notes:**

Date Collected: NA

Date Received: NA

Date Analyzed: 8/30/16

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,000	1,060	106	75-148	

## COKE OVEN GAS ANALYSIS



## Certificate of Analysis: DP16-10780.001

Date: 29-Sep-2016

ENVIRONMENTAL QUALITY MANAGEMENT INC  
1800 CARILLON BLVD  
CINCINNATI  
UNITED STATES  
45240

The results shown in this test report specifically refer to the sample(s) tested as received unless otherwise stated. All tests have been performed using the latest revision of the methods indicated, unless specifically marked otherwise on the report. Precision parameters apply in the determination of the below results. Users of the data shown on this report should refer to the latest published revisions of ASTM D3244; IP 367 and ISO 4259 and when utilising the test data to determine conformance with any specification or process requirement. With respect to the UOP methods listed in the report below the user is referred to the method and the statement within it specifying that the precision statements were determined using UOP Method 999. This Test Report is issued under the Company's General Conditions of Service (copy available upon request or on the company website at [www.sgs.com](http://www.sgs.com)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This report shall not be reproduced except in full, without the written approval of the laboratory.

WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Run 1
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	30-Aug-2016	RECEIVED :	08-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
<b>Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by GC</b>	ASTM D7833			
Hydrogen by TCD		4.67 % Mole	--	--
Nitrogen by TCD		74.35 % Mole	--	--
Oxygen by TCD		17.73 % Mole	--	--
Carbon Monoxide by TCD		0.70 % Mole	--	--
Carbon Dioxide by TCD		0.44 % Mole	--	--
Hydrogen Sulfide by TCD§		<0.03 % Mole	--	--
Methane by FID		1.84 % Mole	--	--
Ethane by FID		0.07 % Mole	--	--
Propane by FID		0.005 % Mole	--	--
Propylene by FID		0.01 % Mole	--	--
Iso-Butane by FID		<0.005 % Mole	--	--
n-Butane by FID		<0.005 % Mole	--	--
Iso-Pentane by FID		<0.005 % Mole	--	--
n-Pentane by FID		<0.005 % Mole	--	--
Neopentane by FID		<0.005 % Mole	--	--
C5-Olefins by FID		<0.005 % Mole	--	--
Cis-2-Butene by FID		<0.005 % Mole	--	--
Trans-2-Butene by FID		<0.005 % Mole	--	--
1,3-Butadiene by FID		<0.005 % Mole	--	--
Benzene by FID		0.02 % Mole	--	--
n-Hexane by FID		<0.005 % Mole	--	--
Heptanes and Heavier by FID		<0.005 % Mole	--	--
C8 Plus by FID §		0.01 % Mole	--	--
<b>Compressibility Factor</b>	ASTM D3588	0.9996 ---	--	--
<b>Ideal Relative Density</b>	ASTM D3588	0.9454 ---	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	580 Btu/lbm	--	--

§ - Analyte not in published method scope

AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

2909201619070000179443

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OGC-En\_report-2014-08-12\_v59I

SGS North America Inc.

Oil, Gas & Chemicals Services 1201A West 8th Street, Deer Park, TX, 77536, U.S.A. Tel: +1-(281)-479-7170

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## Certificate of Analysis: DP16-10780.001

Date: 29-Sep-2016

ENVIRONMENTAL QUALITY MANAGEMENT INC  
1800 CARILLON BLVD  
CINCINNATI  
UNITED STATES  
45240

CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Run 1
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	30-Aug-2016	RECEIVED	08-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
Ideal Gross Heating Value	ASTM D3588	42.6 Btu/ft <sup>3</sup>	--	--

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AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

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Page 2 of 6

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## Certificate of Analysis: DP16-10780.002

Date: 29-Sep-2016

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CINCINNATI  
UNITED STATES  
45240

WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Run 2
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	01-Sep-2016	RECEIVED :	08-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
<b>Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by GC</b>	ASTM D7833			
Hydrogen by TCD		35.55 % Mole	--	--
Nitrogen by TCD		32.50 % Mole	--	--
Oxygen by TCD		6.59 % Mole	--	--
Carbon Monoxide by TCD		3.38 % Mole	--	--
Carbon Dioxide by TCD		1.13 % Mole	--	--
Hydrogen Sulfide by TCD§		<0.03 % Mole	--	--
Methane by FID		17.96 % Mole	--	--
Ethane by FID		0.67 % Mole	--	--
Propane by FID		0.04 % Mole	--	--
Propylene by FID		0.11 % Mole	--	--
Iso-Butane by FID		0.02 % Mole	--	--
n-Butane by FID		0.005 % Mole	--	--
Iso-Pentane by FID		<0.005 % Mole	--	--
n-Pentane by FID		<0.005 % Mole	--	--
Neopentane by FID		<0.005 % Mole	--	--
C5-Olefins by FID		<0.005 % Mole	--	--
Cis-2-Butene by FID		<0.005 % Mole	--	--
Trans-2-Butene by FID		<0.005 % Mole	--	--
1,3-Butadiene by FID		0.01 % Mole	--	--
Benzene by FID		0.58 % Mole	--	--
n-Hexane by FID		0.01 % Mole	--	--
Heptanes and Heavier by FID		<0.005 % Mole	--	--
C8 Plus by FID §		0.07 % Mole	--	--
<b>Compressibility Factor</b>	ASTM D3588	0.9996 ---	--	--
<b>Ideal Relative Density</b>	ASTM D3588	0.6029 ---	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	8085 Btu/lbm	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	378.4 Btu/ft³	--	--

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AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

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## Certificate of Analysis: DP16-10780.003

Date: 29-Sep-2016

ENVIRONMENTAL QUALITY MANAGEMENT INC  
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CINCINNATI  
UNITED STATES  
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CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Sample 1
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	06-Sep-2016	RECEIVED :	12-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
<b>Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by GC</b>	ASTM D7833			
Hydrogen by TCD		50.77 % Mole	--	--
Nitrogen by TCD		16.36 % Mole	--	--
Oxygen by TCD		1.83 % Mole	--	--
Carbon Monoxide by TCD		6.68 % Mole	--	--
Carbon Dioxide by TCD		2.44 % Mole	--	--
Hydrogen Sulfide by TCD§		<0.03 % Mole	--	--
Methane by FID		19.02 % Mole	--	--
Ethane by FID		0.77 % Mole	--	--
Propane by FID		0.02 % Mole	--	--
Propylene by FID		0.11 % Mole	--	--
Iso-Butane by FID		0.01 % Mole	--	--
n-Butane by FID		<0.005 % Mole	--	--
Iso-Pentane by FID		<0.005 % Mole	--	--
n-Pentane by FID		<0.005 % Mole	--	--
Neopentane by FID		<0.005 % Mole	--	--
C5-Olefins by FID		<0.005 % Mole	--	--
Cis-2-Butene by FID		<0.005 % Mole	--	--
Trans-2-Butene by FID		<0.005 % Mole	--	--
1,3-Butadiene by FID		0.01 % Mole	--	--
Benzene by FID		0.43 % Mole	--	--
n-Hexane by FID		0.01 % Mole	--	--
Heptanes and Heavier by FID		<0.005 % Mole	--	--
C8 Plus by FID §		0.05 % Mole	--	--
<b>Compressibility Factor</b>	ASTM D3588	0.9997 ---	--	--
<b>Ideal Relative Density</b>	ASTM D3588	0.4594 ---	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	12521 Btu/lbm	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	448.2 Btu/ft³	--	--

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AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

2909201619070000179443

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Date: 29-Sep-2016

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CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Sample 2
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	07-Sep-2016	RECEIVED :	12-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
<b>Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by GC</b>	ASTM D7833			
Hydrogen by TCD		47.34 % Mole	--	--
Nitrogen by TCD		17.86 % Mole	--	--
Oxygen by TCD		2.48 % Mole	--	--
Carbon Monoxide by TCD		6.23 % Mole	--	--
Carbon Dioxide by TCD		2.08 % Mole	--	--
Hydrogen Sulfide by TCD§		<0.03 % Mole	--	--
Methane by FID		20.77 % Mole	--	--
Ethane by FID		0.74 % Mole	--	--
Propane by FID		0.03 % Mole	--	--
Propylene by FID		0.13 % Mole	--	--
Iso-Butane by FID		0.01 % Mole	--	--
n-Butane by FID		<0.005 % Mole	--	--
Iso-Pentane by FID		<0.005 % Mole	--	--
n-Pentane by FID		<0.005 % Mole	--	--
Neopentane by FID		<0.005 % Mole	--	--
C5-Olefins by FID		<0.005 % Mole	--	--
Cis-2-Butene by FID		<0.005 % Mole	--	--
Trans-2-Butene by FID		<0.005 % Mole	--	--
1,3-Butadiene by FID		0.02 % Mole	--	--
Benzene by FID		0.71 % Mole	--	--
n-Hexane by FID		0.02 % Mole	--	--
Heptanes and Heavier by FID		<0.005 % Mole	--	--
C8 Plus by FID §		0.08 % Mole	--	--
<b>Compressibility Factor</b>	ASTM D3588	0.9996 ---	--	--
<b>Ideal Relative Density</b>	ASTM D3588	0.4866 ---	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	12248 Btu/lbm	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	463.4 Btu/ft³	--	--

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AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

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## Certificate of Analysis: DP16-10780.005

Date: 29-Sep-2016

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WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

CLIENT ORDER NUMBER :	500740172	SGS ORDER NO.:	4028848
LOCATION :	Cincinnati Ohio	PRODUCT DESCRIPTION :	Gas - Coker Oven Gas Sample
SAMPLE SOURCE :	As Supplied	SOURCE ID :	COG
SAMPLE TYPE :	As Submitted	SAMPLED BY :	Client
SAMPLED :	07-Sep-2016	RECEIVED :	12-Sep-2016
ANALYSED :	20-Sep-2016	COMPLETED :	28-Sep-2016

PROPERTY	METHOD	RESULT UNITS	MIN	MAX
<b>Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by GC</b>	ASTM D7833			
Hydrogen by TCD		42.29 % Mole	--	--
Nitrogen by TCD		22.46 % Mole	--	--
Oxygen by TCD		2.92 % Mole	--	--
Carbon Monoxide by TCD		5.16 % Mole	--	--
Carbon Dioxide by TCD		2.90 % Mole	--	--
Hydrogen Sulfide by TCD§		<0.03 % Mole	--	--
Methane by FID		20.53 % Mole	--	--
Ethane by FID		0.96 % Mole	--	--
Propane by FID		0.05 % Mole	--	--
Propylene by FID		0.17 % Mole	--	--
Iso-Butane by FID		0.01 % Mole	--	--
n-Butane by FID		0.007 % Mole	--	--
Iso-Pentane by FID		<0.005 % Mole	--	--
n-Pentane by FID		<0.005 % Mole	--	--
Neopentane by FID		<0.005 % Mole	--	--
C5-Olefins by FID		<0.005 % Mole	--	--
Cis-2-Butene by FID		<0.005 % Mole	--	--
Trans-2-Butene by FID		<0.005 % Mole	--	--
1,3-Butadiene by FID		0.02 % Mole	--	--
Benzene by FID		0.66 % Mole	--	--
n-Hexane by FID		0.02 % Mole	--	--
Heptanes and Heavier by FID		<0.005 % Mole	--	--
C8 Plus by FID §		0.09 % Mole	--	--
<b>Compressibility Factor</b>	ASTM D3588	0.9995 ---	--	--
<b>Ideal Relative Density</b>	ASTM D3588	0.5392 ---	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	10772 Btu/lbm	--	--
<b>Ideal Gross Heating Value</b>	ASTM D3588	450.9 Btu/ft³	--	--
<b>** End of Analytical Results **</b>				

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AUTHORISED SIGNATORY

Mankata Inkumsah  
Lab Supervisor

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## **SPECIATED VOLATILE ORGANIC HAP (VOHAP)**



10-Oct-2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Boulevard  
Cincinnati, OH 45240

Tel: (513) 825-7500  
Fax: (513) 825-7495

Re: AKSteel ICR Project # 050074.0172

Work Order: **1609064**

Dear Doug,

ALS Environmental received 6 samples on 02-Sep-2016 11:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 15.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

**Chris Gibson**

Electronically approved by: Chris Gibson

Chris Gibson  
Project Manager

ADDRESS 4388 Glendale Milford Rd Cincinnati, Ohio 45242- | PHONE (513) 733-5336 | FAX (513) 733-5347

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## ALS Environmental

Date: 10-Oct-16

**Client:** Environmental Quality Management  
**Project:** AKSteel ICR Project # 050074.0172  
**Work Order:** 1609064

## Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1609064-01	P-316-1	Impinger		8/30/2016	9/2/2016 11:30	<input type="checkbox"/>
1609064-02	P-316-2	Impinger		8/31/2016	9/2/2016 11:30	<input type="checkbox"/>
1609064-03	P-316-3	Impinger		9/1/2016	9/2/2016 11:30	<input type="checkbox"/>
1609064-04	P-0031-1	Impinger		8/30/2016	9/2/2016 11:30	<input type="checkbox"/>
1609064-05	P-0031-2	Impinger		8/31/2016	9/2/2016 11:30	<input type="checkbox"/>
1609064-06	P-0031-3	Impinger		9/1/2016	9/2/2016 11:30	<input type="checkbox"/>

---

**Client:** Environmental Quality Management

**Project:** AKSteel ICR Project # 050074.0172

**Work Order:** 1609064

**Case Narrative**

---

Formaldehyde analysis - fraction A is impingers 1 and 2, fraction B is impinger 3.

**ALS Environmental**

Date: 10-Oct-16

Client: Environmental Quality Management

Project: AKSteel ICR Project # 050074.0172

Sample ID: P-316-1

Collection Date: 8/30/2016

Work Order: 1609064

Lab ID: 1609064-01

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>FORMALDEHYDE EMISSIONS BY EPA 316</b>			<b>E316</b>			Analyst: <b>SBD</b>
Formaldehyde	ND		0.0025	mg/sample	1	9/13/2016
Formaldehyde	ND		0.0025	mg/sample	1	9/13/2016

**Note:**

**ALS Environmental**

Date: 10-Oct-16

Client: Environmental Quality Management

Project: AKSteel ICR Project # 050074.0172

Sample ID: P-316-2

Collection Date: 8/31/2016

Work Order: 1609064

Lab ID: 1609064-02

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>FORMALDEHYDE EMISSIONS BY EPA 316</b>			<b>E316</b>			Analyst: <b>SBD</b>
Formaldehyde	ND		0.0025	mg/sample	1	9/13/2016
Formaldehyde	0.0067		0.0025	mg/sample	1	9/13/2016

Note:

## ALS Environmental

Date: 10-Oct-16

Client: Environmental Quality Management

Project: AKSteel ICR Project # 050074.0172

Sample ID: P-316-3

Collection Date: 9/1/2016

Work Order: 1609064

Lab ID: 1609064-03

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>FORMALDEHYDE EMISSIONS BY EPA 316</b>			<b>E316</b>			Analyst: <b>SBD</b>
Formaldehyde	ND		0.0025	mg/sample	1	9/13/2016
Formaldehyde	0.084		0.0025	mg/sample	1	9/13/2016

Note:

**ALS Environmental**

Date: 10-Oct-16

Client: Environmental Quality Management

Project: AKSteel ICR Project # 050074.0172

Sample ID: P-0031-1

Collection Date: 8/30/2016

Work Order: 1609064

Lab ID: 1609064-04

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>			Analyst: LAK
1,1,1-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
1,1,2,2-Tetrachloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
1,1,2-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
1,1-Dichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
1,2-Dichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
1,2-Dichloropropane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Benzene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Bromoform	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Bromomethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Carbon disulfide	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Carbon tetrachloride	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Chlorobenzene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Chloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Chloroform	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Chloromethane	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Ethylbenzene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Methylene chloride	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Styrene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Tetrachloroethene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Toluene	ND	H	5.0	µg/L	1	9/8/2016 01:44 PM
Vinyl chloride	ND	H	2.0	µg/L	1	9/8/2016 01:44 PM
Xylenes, Total	ND	H	10	µg/L	1	9/8/2016 01:44 PM
Surr: 4-Bromofluorobenzene	99.2		61-131	%REC	1	9/8/2016 01:44 PM
Surr: Dibromofluoromethane	97.2		87-126	%REC	1	9/8/2016 01:44 PM
Surr: Toluene-d8	101		84-111	%REC	1	9/8/2016 01:44 PM

Note:

**ALS Environmental**

Date: 10-Oct-16

Client: Environmental Quality Management

Project: AKSteel ICR Project # 050074.0172

Sample ID: P-0031-2

Collection Date: 8/31/2016

Work Order: 1609064

Lab ID: 1609064-05

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>			Analyst: LAK
1,1,1-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
1,1,2,2-Tetrachloroethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
1,1,2-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
1,1-Dichloroethene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
1,2-Dichloroethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
1,2-Dichloropropane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Benzene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Bromoform	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Bromomethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Carbon disulfide	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Carbon tetrachloride	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Chlorobenzene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Chloroethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Chloroform	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Chloromethane	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Ethylbenzene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Methylene chloride	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Styrene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Tetrachloroethene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Toluene	ND	H	5.0	µg/L	1	9/8/2016 02:14 PM
Vinyl chloride	ND	H	2.0	µg/L	1	9/8/2016 02:14 PM
Xylenes, Total	ND	H	10	µg/L	1	9/8/2016 02:14 PM
Surr: 4-Bromofluorobenzene	99.3		61-131	%REC	1	9/8/2016 02:14 PM
Surr: Dibromofluoromethane	97.1		87-126	%REC	1	9/8/2016 02:14 PM
Surr: Toluene-d8	102		84-111	%REC	1	9/8/2016 02:14 PM

Note:

**ALS Environmental****Date:** 10-Oct-16**Client:** Environmental Quality Management**Project:** AKSteel ICR Project # 050074.0172**Work Order:** 1609064**Sample ID:** P-0031-3**Lab ID:** 1609064-06**Collection Date:** 9/1/2016**Matrix:** IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>			Analyst: LAK
1,1,1-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
1,1,2,2-Tetrachloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
1,1,2-Trichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
1,1-Dichloroethene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
1,2-Dichloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
1,2-Dichloropropane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Benzene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Bromoform	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Bromomethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Carbon disulfide	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Carbon tetrachloride	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Chlorobenzene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Chloroethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Chloroform	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Chloromethane	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Ethylbenzene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Methylene chloride	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Styrene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Tetrachloroethene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Toluene	ND	H	5.0	µg/L	1	9/8/2016 01:14 PM
Vinyl chloride	ND	H	2.0	µg/L	1	9/8/2016 01:14 PM
Xylenes, Total	ND	H	10	µg/L	1	9/8/2016 01:14 PM
Surr: 4-Bromofluorobenzene	98.6		61-131	%REC	1	9/8/2016 01:14 PM
Surr: Dibromofluoromethane	95.6		87-126	%REC	1	9/8/2016 01:14 PM
Surr: Toluene-d8	101		84-111	%REC	1	9/8/2016 01:14 PM

**Note:**

# ALS Environmental

Date: 10-Oct-16

**Client:** Environmental Quality Management  
**Work Order:** 1609064  
**Project:** AKSteel ICR Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R132682** Instrument ID **VMS1** Method: **SW8260B**

MBLK		Sample ID: MBLK-R132682			Units: µg/L		Analysis Date: 9/8/2016 08:09 AM			
Client ID:		Run ID: VMS1_160908A			SeqNo: 1351509		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
1,2-Dichloropropane	ND	5.0								
Benzene	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	5.0								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
Methylene chloride	ND	5.0								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	10								
Surr: 4-Bromofluorobenzene	52.09	0	50	0	104	61-131		0		
Surr: Dibromofluoromethane	48.3	0	50	0	96.6	87-126		0		
Surr: Toluene-d8	50.12	0	50	0	100	84-111		0		

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Quality Management  
 Work Order: 1609064  
 Project: AKSteel ICR Project # 050074.0172

## QC BATCH REPORT

Batch ID: R132682 Instrument ID VMS1 Method: SW8260B

LCS	Sample ID: LCS-R132682				Units: µg/L		Analysis Date: 9/8/2016 08:39 AM			
Client ID:		Run ID: VMS1_160908A			SeqNo: 1351510		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	47.94	5.0	50	0	95.9	48.4-140	0			
1,1-Dichloroethene	45.11	5.0	50	0	90.2	45.5-150	0			
1,2-Dichloroethane	50.63	5.0	50	0	101	46.5-141	0			
Benzene	47.11	5.0	50	0	94.2	50.7-134	0			
Carbon tetrachloride	47.15	5.0	50	0	94.3	45.5-143	0			
Chlorobenzene	48.2	5.0	50	0	96.4	45-133	0			
Chloroform	49.25	5.0	50	0	98.5	52.4-136	0			
Ethylbenzene	47.67	5.0	50	0	95.3	37.8-145	0			
Styrene	49.68	5.0	50	0	99.4	26.3-172	0			
Tetrachloroethene	50.26	5.0	50	0	101	37.3-139	0			
Toluene	47.89	5.0	50	0	95.8	44-135	0			
Xylenes, Total	145.7	10	150	0	97.1	47.3-132	0			
Surr: 4-Bromofluorobenzene	48.55	0	50	0	97.1	61-131	0			
Surr: Dibromofluoromethane	50.21	0	50	0	100	87-126	0			
Surr: Toluene-d8	50.64	0	50	0	101	84-111	0			

MS				Sample ID: 1609071-05A MS		Units: µg/L		Analysis Date: 9/8/2016 09:09 AM		
Client ID:		Run ID: VMS1_160908A			SeqNo: 1351511		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	44.22	5.0	50	0	88.4	40.4-134	0			
1,1-Dichloroethene	40.05	5.0	50	0	80.1	45.3-151	0			
1,2-Dichloroethane	45.82	5.0	50	0	91.6	37-139	0			
Benzene	43.28	5.0	50	0	86.6	37.4-144	0			
Carbon tetrachloride	43.45	5.0	50	0	86.9	33.8-150	0			
Chlorobenzene	45.3	5.0	50	0	90.6	52.4-132	0			
Chloroform	45.62	5.0	50	0	91.2	45.5-135	0			
Ethylbenzene	44.5	5.0	50	0	89	46.5-146	0			
Styrene	45.69	5.0	50	0	91.4	20.9-184	0			
Tetrachloroethene	45.3	5.0	50	0	90.6	55.2-134	0			
Toluene	44.83	5.0	50	0	89.7	32.7-140	0			
Xylenes, Total	136.1	10	150	0	90.7	43.6-148	0			
Surr: 4-Bromofluorobenzene	48.11	0	50	0	96.2	61-131	0			
Surr: Dibromofluoromethane	49.83	0	50	0	99.7	87-126	0			
Surr: Toluene-d8	50.25	0	50	0	100	84-111	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Quality Management  
 Work Order: 1609064  
 Project: AKSteel ICR Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R132682** Instrument ID **VMS1** Method: **SW8260B**

MSD		Sample ID: 1609071-05A MSD				Units: µg/L		Analysis Date: 9/8/2016 09:39 AM		
Client ID:		Run ID: VMS1_160908A				SeqNo: 1351512		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	45.03	5.0	50	0	90.1	40.4-134	44.22	1.82	20	
1,1-Dichloroethene	41.86	5.0	50	0	83.7	45.3-151	40.05	4.42	20	
1,2-Dichloroethane	48.84	5.0	50	0	97.7	37-139	45.82	6.38	20	
Benzene	44.22	5.0	50	0	88.4	37.4-144	43.28	2.15	20	
Carbon tetrachloride	43.26	5.0	50	0	86.5	33.8-150	43.45	0.438	20	
Chlorobenzene	44.86	5.0	50	0	89.7	52.4-132	45.3	0.976	20	
Chloroform	47.22	5.0	50	0	94.4	45.5-135	45.62	3.45	20	
Ethylbenzene	44.65	5.0	50	0	89.3	46.5-146	44.5	0.337	20	
Styrene	45.25	5.0	50	0	90.5	20.9-184	45.69	0.968	20	
Tetrachloroethene	45.27	5.0	50	0	90.5	55.2-134	45.3	0.0662	20	
Toluene	44.71	5.0	50	0	89.4	32.7-140	44.83	0.268	20	
Xylenes, Total	135.4	10	150	0	90.3	43.6-148	136.1	0.508	20	
Surr: 4-Bromofluorobenzene	47.72	0	50	0	95.4	61-131	48.11	0.814		
Surr: Dibromofluoromethane	49.88	0	50	0	99.8	87-126	49.83	0.1		
Surr: Toluene-d8	49.82	0	50	0	99.6	84-111	50.25	0.859		

The following samples were analyzed in this batch:

1609064-04A	1609064-05A	1609064-06A
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Note: See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Environmental Quality Management  
**Work Order:** 1609064  
**Project:** AKSteel ICR Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R132827** Instrument ID **UVVIS1** Method: **E316**

<b>MBLK</b>	Sample ID: <b>MB-R132827-R132827</b>				Units: <b>mg/sample</b>		Analysis Date: <b>9/13/2016</b>			
Client ID:	Run ID: <b>UVVIS1_160913B</b>				SeqNo: <b>1354706</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Formaldehyde ND 0.0025

The following samples were analyzed in this batch:

1609064-01A	1609064-01B	1609064-02A
1609064-02B	1609064-03A	1609064-03B

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Environmental Quality Management  
**Project:** AKSteel ICR Project # 050074.0172  
**WorkOrder:** 1609064

## **QUALIFIERS, ACRONYMS, UNITS**

<b><u>Qualifier</u></b>	<b><u>Description</u></b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

<b><u>Acronym</u></b>	<b><u>Description</u></b>
DUP	Method Duplicate
E	EPA Method
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SDL	Sample Detection Limit
SW	SW-846 Method

<b><u>Units Reported</u></b>	<b><u>Description</u></b>
µg/L	
mg/sample	

# ALS Environmental

## Sample Receipt Checklist

Client Name: EQM-CINCINNATI

Date/Time Received: 02-Sep-16 11:30

Work Order: 1609064

Received by: JNW

Checklist completed by Jan Wilcox  
eSignature

02-Sep-16  
Date

Reviewed by: Carol Koehler  
eSignature

12-Sep-16  
Date

Matrices:

Carrier name: Client

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<input type="text"/>		
Cooler(s)/Kit(s):	<input type="text"/>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<input type="text"/>		
Login Notes:	<input type="text"/>		

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



03-Oct-2016

Doug Allen  
Environmental Quality Management  
1800 Carillon Boulevard  
Cincinnati, OH 45240

Tel: (513) 825-7500  
Fax: (513) 825-7495

Re: AK Middletown; Project # 050074.0172

Work Order: **1609539**

Dear Doug,

ALS Environmental received 3 samples on 19-Sep-2016 04:17 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 11.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

**Chris Gibson**

Electronically approved by: Chris Gibson

Chris Gibson  
Project Manager

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Environmental

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**ALS Environmental**

Date: 03-Oct-16

**Client:** Environmental Quality Management  
**Project:** AK Middletown; Project # 050074.0172  
**Work Order:** 1609539

**Work Order Sample Summary**

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1609539-01	C-316-4	Impinger		9/15/2016	9/21/2016	<input type="checkbox"/>
1609539-02	C-316-4	Impinger		9/15/2016	9/21/2016	<input type="checkbox"/>
1609539-03	C-0031-4	Impinger		9/15/2016	9/21/2016	<input type="checkbox"/>

## ALS Environmental

Date: 03-Oct-16

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**Client:** Environmental Quality Management  
**Project:** AK Middletown; Project # 050074.0172  
**Work Order:** 1609539

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### Case Narrative

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Results relate only to the items tested and are not blank corrected unless indicated.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

**ALS Environmental****Date:** 03-Oct-16**Client:** Environmental Quality Management  
**Project:** AK Middletown; Project # 050074.0172**Work Order:** 1609539**Lab ID:** 1609539-01A**Collection Date:** 9/15/2016**Client Sample ID:** C-316-4**Matrix:** IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
FORMALDEHYDE EMISSIONS BY EPA 316			E316			Analyst: SBD
Formaldehyde	ND			mg/sample	1	9/26/2016

**Lab ID:** 1609539-02A**Collection Date:** 9/15/2016**Client Sample ID:** C-316-4**Matrix:** IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
FORMALDEHYDE EMISSIONS BY EPA 316			E316			Analyst: SBD
Formaldehyde	ND			mg/sample	1	9/26/2016

**Note:**

# ALS Environmental

Date: 03-Oct-16

Client: Environmental Quality Management  
Project: AK. Middletown; Project # 050074.0172

Work Order: 1609539

Lab ID: 1609539-03A

Collection Date: 9/15/2016

Client Sample ID: C-0031-4

Matrix: IMPINGER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>VOLATILE ORGANIC COMPOUNDS</b>			<b>SW8260B</b>			Analyst: LAK
1,1,1-Trichloroethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
1,1,2,2-Tetrachloroethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
1,1,2-Trichloroethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
1,1-Dichloroethene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
1,2-Dichloroethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
1,2-Dichloropropane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Benzene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Bromoform	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Bromomethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Carbon disulfide	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Carbon tetrachloride	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Chlorobenzene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Chloroethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Chloroform	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Chloromethane	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Ethylbenzene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
<b>Methylene chloride</b>	<b>35</b>		<b>5.0</b>	<b>µg/L</b>	1	9/22/2016 01:44 PM
Styrene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
Tetrachloroethene	ND		5.0	µg/L	1	9/22/2016 01:44 PM
<b>Toluene</b>	<b>10</b>		<b>5.0</b>	<b>µg/L</b>	1	9/22/2016 01:44 PM
Vinyl chloride	ND		2.0	µg/L	1	9/22/2016 01:44 PM
Xylenes, Total	ND		10	µg/L	1	9/22/2016 01:44 PM
Surr: 4-Bromofluorobenzene	113		61-131	%REC	1	9/22/2016 01:44 PM
Surr: Dibromofluoromethane	102		87-126	%REC	1	9/22/2016 01:44 PM
Surr: Toluene-d8	101		84-111	%REC	1	9/22/2016 01:44 PM

Note:

# ALS Environmental

Date: 03-Oct-16

**Client:** Environmental Quality Management  
**Work Order:** 1609539  
**Project:** AK Middletown; Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R133126** Instrument ID **VMS1** Method: **SW8260B**

MBLK	Sample ID: MBLK-R133126			Units: µg/L			Analysis Date: 9/22/2016 11:43 AM			
Client ID:	Run ID: VMS1_160922A			SeqNo: 1360819			Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	2.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
1,1,2-Trichloroethane	ND	2.0								
1,1-Dichloroethene	ND	2.0								
1,2-Dichloroethane	ND	2.0								
1,2-Dichloropropane	ND	2.0								
Benzene	ND	2.0								
Bromoform	ND	2.0								
Bromomethane	ND	2.0								
Carbon disulfide	ND	2.0								
Carbon tetrachloride	ND	2.0								
Chlorobenzene	ND	2.0								
Chloroethane	ND	2.0								
Chloroform	ND	2.0								
Chloromethane	ND	2.0								
Ethylbenzene	ND	2.0								
Methylene chloride	ND	2.0								
Styrene	ND	2.0								
Tetrachloroethene	ND	2.0								
Toluene	ND	2.0								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	4.0								
Surr: 4-Bromofluorobenzene	55.88	0	50	0	112	61-131	0			
Surr: Dibromofluoromethane	51.56	0	50	0	103	87-126	0			
Surr: Toluene-d8	49.92	0	50	0	99.8	84-111	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Quality Management  
 Work Order: 1609539  
 Project: AK Middletown; Project # 050074.0172

## QC BATCH REPORT

Batch ID: R133126 Instrument ID VMS1 Method: SW8260B

LCS		Sample ID: LCS-R133126			Units: µg/L		Analysis Date: 9/22/2016 08:11 AM			
Client ID:		Run ID: VMS1_160922A			SeqNo: 1360812		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	55.15	5.0	50	0	110	48.4-140	0			
1,1-Dichloroethene	57.39	5.0	50	0	115	45.5-150	0			
1,2-Dichloroethane	50.42	5.0	50	0	101	46.5-141	0			
Benzene	52.11	5.0	50	0	104	50.7-134	0			
Carbon tetrachloride	55.24	5.0	50	0	110	45.5-143	0			
Chlorobenzene	50.33	5.0	50	0	101	45-133	0			
Chloroform	56.28	5.0	50	0	113	52.4-136	0			
Ethylbenzene	50.65	5.0	50	0	101	37.8-145	0			
Styrene	50.6	5.0	50	0	101	26.3-172	0			
Tetrachloroethene	51.36	5.0	50	0	103	37.3-139	0			
Toluene	51.89	5.0	50	0	104	44-135	0			
Xylenes, Total	148.8	10	150	0	99.2	47.3-132	0			
Surr: 4-Bromofluorobenzene	55.83	0	50	0	112	61-131	0			
Surr: Dibromofluoromethane	53.71	0	50	0	107	87-126	0			
Surr: Toluene-d8	50.68	0	50	0	101	84-111	0			

MS		Sample ID: 1609591-01A MS			Units: µg/L		Analysis Date: 9/22/2016 08:41 AM			
Client ID:		Run ID: VMS1_160922A			SeqNo: 1360813		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	51.2	5.0	50	0	102	40.4-134	0			
1,1-Dichloroethene	54.75	5.0	50	0	110	45.3-151	0			
1,2-Dichloroethane	49.06	5.0	50	0	98.1	37-139	0			
Benzene	49.38	5.0	50	0	98.8	37.4-144	0			
Carbon tetrachloride	52.17	5.0	50	0	104	33.8-150	0			
Chlorobenzene	46.33	5.0	50	0	92.7	52.4-132	0			
Chloroform	52.54	5.0	50	0	105	45.5-135	0			
Ethylbenzene	45.67	5.0	50	0	91.3	46.5-146	0			
Styrene	46.45	5.0	50	0	92.9	20.9-184	0			
Tetrachloroethene	46.95	5.0	50	0	93.9	55.2-134	0			
Toluene	48.44	5.0	50	0	96.9	32.7-140	0			
Xylenes, Total	135.1	10	150	0	90.1	43.6-148	0			
Surr: 4-Bromofluorobenzene	56.07	0	50	0	112	61-131	0			
Surr: Dibromofluoromethane	52.5	0	50	0	105	87-126	0			
Surr: Toluene-d8	50.34	0	50	0	101	84-111	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Environmental Quality Management  
**Work Order:** 1609539  
**Project:** AK Middletown; Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R133126**      Instrument ID **VMS1**      Method: **SW8260B**

MSD				Sample ID: 1609591-01A MSD		Units: µg/L		Analysis Date: 9/22/2016 09:11 AM		
Client ID:		Run ID: VMS1_160922A			SeqNo: 1360814		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	50.5	5.0	50	0	101	40.4-134	51.2	1.38	20	
1,1-Dichloroethene	54.19	5.0	50	0	108	45.3-151	54.75	1.03	20	
1,2-Dichloroethane	49.11	5.0	50	0	98.2	37-139	49.06	0.102	20	
Benzene	48.52	5.0	50	0	97	37.4-144	49.38	1.76	20	
Carbon tetrachloride	50.15	5.0	50	0	100	33.8-150	52.17	3.95	20	
Chlorobenzene	46.28	5.0	50	0	92.6	52.4-132	46.33	0.108	20	
Chloroform	52.63	5.0	50	0	105	45.5-135	52.54	0.171	20	
Ethylbenzene	45.48	5.0	50	0	91	46.5-146	45.67	0.417	20	
Styrene	46.51	5.0	50	0	93	20.9-184	46.45	0.129	20	
Tetrachloroethene	46.86	5.0	50	0	93.7	55.2-134	46.95	0.192	20	
Toluene	46.92	5.0	50	0	93.8	32.7-140	48.44	3.19	20	
Xylenes, Total	134.7	10	150	0	89.8	43.6-148	135.1	0.252	20	
Surr: 4-Bromofluorobenzene	54.12	0	50	0	108	61-131	56.07	3.54		
Surr: Dibromofluoromethane	53.82	0	50	0	108	87-126	52.5	2.48		
Surr: Toluene-d8	50.6	0	50	0	101	84-111	50.34	0.515		

The following samples were analyzed in this batch:

1609539-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Environmental Quality Management  
**Work Order:** 1609539  
**Project:** AK Middletown; Project # 050074.0172

## QC BATCH REPORT

Batch ID: **R133217** Instrument ID **UVVIS1** Method: **E316**

<b>MBLK</b>	Sample ID: <b>MB-R133217-R133217</b>				Units: <b>mg/sample</b>		Analysis Date: <b>9/26/2016</b>			
Client ID:	Run ID: <b>UVVIS1_160926B</b>				SeqNo: <b>1362785</b>		Prep Date:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Formaldehyde ND 0

The following samples were analyzed in this batch:

1609539-01A 1609539-02A

**ALS Environmental**

Date: 03-Oct-16

**Client:** Environmental Quality Management  
**Project:** AK Middletown; Project # 050074.0172  
**WorkOrder:** 1609539

**QUALIFIERS,  
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
E	EPA Method
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SDL	Sample Detection Limit
SW	SW-846 Method

<u>Units Reported</u>	<u>Description</u>
µg/L	
mg/sample	

# ALS Environmental

## Sample Receipt Checklist

Client Name: EQM-CINCINNATI

Date/Time Received: 19-Sep-16 16:17

Work Order: 1609539

Received by: SNH

Checklist completed by Jan Wilcox

21-Sep-16

Reviewed by: Chris Gibson

26-Sep-16

eSignature

Date

eSignature

Date

Matrices:

Carrier name: Client

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐

No ☐

Not Present ☒

Custody seals intact on sample bottles?

Yes ☐

No ☐

Not Present ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Container/Temp Blank temperature in compliance?

Yes ☒

No ☐

Temperature(s)/Thermometer(s):

Cooler(s)/Kit(s):

Water - VOA vials have zero headspace?

Yes ☐

No ☐

No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☐

No ☐

N/A ☐

pH adjusted?

Yes ☐

No ☐

N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
Phone: 905-331-3111, FAX: 905-331-4567


## Certificate of Analysis

**ALS Project Contact:** Whitney Davis  
**ALS Project ID:** EQM100  
**ALS WO#:** L1823194  
**Date of Report:** 23-Sep-16  
**Date of Sample Receipt:** 2-Sep-16

**Client Name:** Environmental Quality Management Inc.  
**Client Address:** 1800 Carillon Boulevard  
Cincinnati, OH 45240  
UNITED STATES  
**Client Contact:** Doug Allen  
**Client Project ID:** 50074.0172 AK STEEL ICR

**COMMENTS:** VOCs via SW846 Method 5041A/8260B

Certified by: \_\_\_\_\_

  
Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental										
Sample Analysis Summary Report										
Instrument Column Acquisition Start Date	MSD-3 Rxi-624SIL MS 1099869 9/9/2016	Laboratory Method Blank	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample
Client Sample ID	ALS Sample ID	Method Blank	250ng-controlstd	L1823194-6	L1823194-4	L1823194-10	L1823194-12	L1823194-16	L1823194-18	Recovery Limits
	File Name	16090907.D	16090904.D	16090908.D	16090909.D	16090910.D	16090911.D	16090912.D	16090913.D	
Sampling date	9/9/2016 15:59	Blank	LCS	8/30/2016	8/31/2016	8/31/2016	8/31/2016	9/1/2016	9/1/2016	
Acquisition Time	9/9/2016 14:13	9/9/2016 14:13	9/9/2016 16:47	9/9/2016 17:13	9/9/2016 17:38	9/9/2016 18:04	9/9/2016 18:29	9/9/2016 18:54	9/9/2016 18:54	
Target Analyte ug/sample	RL	Conc. ug/sample	% Rec	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	
Chloromethane	0.06	<	115	<0.06	<0.06	0.114	<0.06	<0.06	<0.06	
Vinyl Chloride	0.02	<	99	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Bromomethane	0.09	<	83	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	
Chloroethane	0.02	<	107	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
1,1-Dichloroethane	0.01	<	99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Iodomethane	0.03	<	NS	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Carbon disulfide	0.02	<	101	<0.02	<0.02	0.020	<0.02	<0.02	<0.02	
Methylene Chloride	0.1	<	97	0.174	0.127	0.217	<0.1	<0.1	<0.1	
Chloroform	0.01	<	102	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
1,1,1-Trichloroethane	0.01	<	93	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Carbon Tetrachloride	0.01	<	89	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzene	0.05	<	87	0.158	0.171	0.053	0.071	<0.05	<0.05	
1,2-Dichloroethane	0.01	<	89	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Trichloroethene	0.01	<	96	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
1,2-Dichloropropane	0.05	<	92	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Toluene	0.02	<	92	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
1,1,2-Trichloroethane	0.01	<	83	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Tetrachloroethene	0.01	<	92	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorobenzene	0.01	<	91	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Ethylbenzene	0.03	<	90	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
m,p-Xylene	0.01	<	89	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
O-Xylene	0.02	<	91	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Styrene	0.01	<	84	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Bromofom	0.02	<	79	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
1,1,2,2-Tetrachloroethane	0.05	<	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Acrylonitrile										
Field Standard		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
d10-Ethylbenzene		107	108	NS	NS	NS	NS	NS	NS	
Surrogate Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
d4-1,2-Dichloroethane		113	95	111	114	117	110	112	114	50-150
d8-Toluene		97	96	107	102	104	106	100	100	50-150
4-Bromofluorobenzene		90	103	82	84	82	87	93	91	50-150
Internal Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
Bromochloromethane		113	113	107	103	108	100	104	104	50-200
1,4-Difluorobenzene		128	111	121	112	116	116	117	117	50-200
d5-Chlorobenzene		117	101	96	92	96	93	99	100	50-200
NS indicates that compound was not spiked										

ALS Environmental									
Sample Analysis Summary Report									
Instrument Column Acquisition Start Date	MSD-3 Rxi-624SII MS 1099869 9/2/2016	Sample Matrix Analysis Units		VOST Tube ug/sample		Recovery Limits			
Client Sample ID	Laboratory Method Blank	Laboratory Control Sample	P-0031-3A (TENAX TUBE#2 + ANASORB 747)	P-0031-1A (TENAX TUBE#2 + ANASORB 747)	P-0031-2A (TENAX TUBE#2 + ANASORB 747)				
ALS Sample ID	VOST-blank 16090208.D	250ng-controlStd 16090206.D	L1823194-14 16090209.D	L1823194-2 16090210.D	L1823194-8 16090211.D				
Sampling date Acquisition Time	9/2/2016 16:15	9/2/2016 14:47	9/2/2016 17:27	9/2/2016 17:53	9/2/2016 18:18				
Target Analyte	RL ug/sample	Conc. ug/sample	% Rec	Conc. ug/sample	Conc. ug/sample	% Rec	Conc. ug/sample	% Rec	% Rec
Chloromethane	0.06	<	58	<0.06	<0.06	<0.06	<0.06	NS	50-150
Vinyl Chloride	0.02	<	44	<0.02	<0.02	<0.02	<0.02	NS	50-150
Bromomethane	0.09	<	98	<0.09	<0.09	<0.09	<0.09	NS	50-150
Chloroethane	0.02	<	84	<0.02	<0.02	<0.02	<0.02	NS	50-150
1,1-Dichloroethane	0.01	<	72	<0.01	<0.01	<0.01	<0.01	NS	50-150
Iodomethane	0.03	<	NS	<0.03	<0.03	<0.03	<0.03	NS	50-200
Carbon disulfide	0.02	<	84	<0.02	<0.02	<0.02	<0.02	NS	50-200
Methylene Chloride	0.1	<	88	<0.1	<0.1	<0.1	<0.1	NS	50-200
Chloroform	0.01	<	93	<0.01	<0.01	<0.01	<0.01	NS	50-200
1,1,1-Trichloroethane	0.01	<	112	<0.01	<0.01	<0.01	<0.01	NS	50-200
Carbon Tetrachloride	0.01	<	114	<0.01	<0.01	<0.01	<0.01	NS	50-200
Benzene	0.05	<	89	<0.05	0.224	0.062	0.062	NS	50-200
1,2-Dichloroethane	0.01	<	103	<0.01	<0.01	<0.01	<0.01	NS	50-200
Trichloroethane	0.01	<	107	<0.01	<0.01	<0.01	<0.01	NS	50-200
1,2-Dichloropropane	0.01	<	98	<0.01	<0.01	<0.01	<0.01	NS	50-200
Toluene	0.05	<	121	<0.05	<0.05	<0.05	<0.05	NS	50-200
1,1,2-Trichloroethane	0.02	<	132	<0.02	<0.02	<0.02	<0.02	NS	50-200
Tetrachloroethane	0.01	<	132	<0.01	<0.01	<0.01	<0.01	NS	50-200
Chlorobenzene	0.01	<	124	<0.01	<0.01	<0.01	<0.01	NS	50-200
Ethylbenzene	0.01	<	122	<0.01	<0.01	<0.01	<0.01	NS	50-200
M&P-Xylene	0.03	<	123	<0.03	<0.03	<0.03	<0.03	NS	50-200
O-Xylene	0.01	<	121	<0.01	<0.01	<0.01	<0.01	NS	50-200
Styrene	0.02	<	112	<0.02	<0.02	<0.02	<0.02	NS	50-200
Bromoform	0.01	<	129	<0.01	<0.01	<0.01	<0.01	NS	50-200
1,1,2,2-Tetrachloroethane	0.02	<	98	<0.02	<0.02	<0.02	<0.02	NS	50-200
Acrylonitrile	0.05	<	NS	<0.05	<0.05	<0.05	<0.05	NS	50-200
Field Standard		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d10-Ethylbenzene		108	113	NS	NS	NS	NS	NS	50-150
Surrogate Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d4-1,2-Dichloroethane		98	97	102	103	104	104	104	50-150
d8-Toluene		112	114	118	118	115	115	115	50-150
4-Bromofluorobenzene		82	93	76	78	78	78	78	50-150
Internal Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Bromochloromethane		114	95	118	111	114	114	114	50-200
1,4-Difluorobenzene		139	96	136	124	128	128	128	50-200
d5-Chlorobenzene		139	89	126	112	122	122	122	50-200
NS	indicates that compound was not spiked								



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
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## Certificate of Analysis

**ALS Project Contact:** Whitney Davis  
**ALS Project ID:** EQM100  
**ALS WO#:** L1826815  
**Date of Report:** 26-Sep-16  
**Date of Sample Receipt:** 9-Sep-16

**Client Name:** Environmental Quality Management Inc.  
**Client Address:** 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
**Client Contact:** Doug Allen  
**Client Project ID:** 50074.0172 AK Steel ICR

### COMMENTS: VOCs via SW846 Method 5041A/8260B

NS = Not spiked

E = Estimated value. Instrument response exceeds instrument calibration range of 2.0 ug.

Ketone data by VOST analyses are estimated values only

Data are presented in sequence of run date and then in sequence of instrumental analysis. This order is provided in order to assist any evaluation and concerns on carry-over from injection to injection.

The first tenax trap was run separately from the second tenax plus the anasorb 747. Ethylbenzene-d10 was spiked into the first tenax trap prior to sampling. Recovery of Ethylbenzene-d10 has been reported from these first tenax traps.

After analysis of a selection of three first tenax traps, the levels of benzene were found to be above the instrument calibration range of 2ug per sample. Therefore all other first tenax traps were analyzed via a modified method where the sample tubes were desorbed through the aqueous purge and into air bags. A 1/20th sub-sample from the air bags was injected and thereby analyzing the equivalence of a 20-fold dilution.

Acrylonitrile was not in the normal multi-point calibrations. Therefore a daily low standard (50ng) was analyzed at the reporting limit as provided. No acrylonitrile was observed in any of the samples.

1,1,1-Trichloroethane recovery is below the normal control limits on the Sept 15th run date only. This target was not observed in any of the samples and therefore no negative impact to data quality is anticipated from this QC criterion exceedence.

**R. McLeod 26-Sep-16**

Certified by:

Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental												
Sample Analysis Summary Report												
Instrument		MSD-3	Sample Matrix		VOST Tube							
Column		Rxi-624SII MS 1360231	Analysis Units		ug/sample							
Acquisition Start Date		9/14/2016										
Client Sample ID			C-0031-1A (TENAX TUBE#2 + ANASORB 747)	C-0031-1C (TENAX TUBE#2 + ANASORB 747)	C-0031-1B (TENAX TUBE#2 + ANASORB 747)	C-0031-1D (TENAX TUBE#2 + ANASORB 747)	C-0031-1E (TENAX TUBE#2 + ANASORB 747)	C-0031-1F (TENAX TUBE#2 + ANASORB 747)	C-0031-2A (TENAX TUBE#2 + ANASORB 747)	C-0031-2B (TENAX TUBE#2 + ANASORB 747)		
ALS Sample ID			L1826815-2 16091409.D	L1826815-6 16091410.D	L1826815-4 16091411.D	L1826815-8 16091412.D	L1826815-10 16091413.D	L1826815-12 16091414.D	L1826815-14 16091415.D	L1826815-16 16091416.D		
Fileame												
Dilution Factor			1	1	1	1	1	1	1	1	1	
Sampling date			9/14/2016 14:23	9/14/2016 13:45	9/14/2016 15:02	9/14/2016 15:27	9/14/2016 16:21	9/14/2016 16:46	9/14/2016 17:11	9/14/2016 18:02	9/14/2016 18:28	
Acquisition Time												
Target Analyte			RL	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	
Analyte ug/sample			ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	
Chloromethane			0.06	<	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	
Vinyl Chloride			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Bromomethane			0.09	<	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	
Chloroethane			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
1,1-Dichloroethane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Iodomethane			0.03	<	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Carbon disulfide			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Methylene Chloride			0.1	<	<0.1	<0.1	<0.1	<0.1	0.181	<0.1	<0.1	
Chloroform			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
1,1,1-Trichloroethane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Carbon Tetrachloride			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzene			0.05	<	0.372	0.659	0.956	0.461	0.396	0.383	0.251	
1,2-Dichloroethane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Trichloroethane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
1,2-Dichloropropane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Toluene			0.05	<	<0.05	0.134	0.235	0.064	<0.05	0.064	<0.05	
1,1,2-Trichloroethane			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Tetrachloroethane			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorobenzene			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Ethylbenzene			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
m&p-Xylene			0.03	<	<0.03	<0.03	0.049	<0.03	<0.03	<0.03	<0.03	
O-Xylene			0.01	<	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	
Styrene			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Bromoform			0.01	<	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
1,1,2,2-Tetrachloroethane			0.02	<	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Acrylonitrile			0.05	<	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Field Standard			% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
d10-Ethylbenzene			118	125	NS	NS	NS	NS	NS	NS	NS	
Surrogate Standards			% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
d4-1,2-Dichloroethane			130	98	115	114	112	115	116	115	114	
d8-Toluene			118	116	119	122	124	120	121	122	121	
4-Bromofluorobenzene			83	96	78	81	80	81	80	107	82	
Internal Standards			% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	
Bromochloromethane			65	122	111	106	110	108	114	110	109	
1,4-Difluorobenzene			72	131	133	126	130	126	130	130	132	
d5-Chlorobenzene			66	117	115	103	104	102	111	107	107	

ALS Environmental											
Instrument Column Acquisition Start Date		Sample Analysis Summary Report Sample Matrix VOST Tube Analysis Units ug/sample									
MSD-3 Pxi-6245II MS 1360231 9/19/2016											
Client Sample ID	Laboratory Method Blank	Laboratory Control Sample	BLANK (TENAX TUBE#1)	C-0031-2B (TENAX TUBE#1)	C-0031-2C (TENAX TUBE#1)	C-0031-1B (TENAX TUBE#1)	C-0031-1C (TENAX TUBE#1)	C-0031-3D (TENAX TUBE#1)	C-0031-3E (TENAX TUBE#1)	C-0031-3F (TENAX TUBE#1)	
ALS Sample ID	VOST blank	250ng-Control std	L1826815-37	L1826815-15	L1826815-17	L1826815-3	L1826815-5	L1826815-31	L1826815-33	L1826815-35	
File name	16091908.D	16091907.D	16091909.D	16091910.D	16091911.D	16091912.D	16091913.D	16091914.D	16091915.D	16091916.D	
Dilution Factor	1	1	1	20	20	20	20	20	20	20	
Sampling date	9/19/2016 16:35	9/19/2016 15:50	9/19/2016 17:00	9/19/2016 17:26	9/19/2016 17:51	9/19/2016 18:16	9/19/2016 18:42	9/19/2016 19:07	9/19/2016 19:33	9/19/2016 19:58	
Acquisition Time	9/19/2016 16:35	9/19/2016 15:50	9/19/2016 17:00	9/19/2016 17:26	9/19/2016 17:51	9/19/2016 18:16	9/19/2016 18:42	9/19/2016 19:07	9/19/2016 19:33	9/19/2016 19:58	
Target Analyte	RL ug/sample	Conc. ug/sample	% Rec	Conc. ug/sample	% Rec	Conc. ug/sample	% Rec	Conc. ug/sample	% Rec	Conc. ug/sample	% Rec
Chloromethane	0.06	< 0.06	148	< 0.06	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Vinyl Chloride	0.02	< 0.02	92	< 0.02	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bromomethane	0.09	< 0.09	88	< 0.09	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chloroethane	0.02	< 0.02	103	< 0.02	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,1-Dichloroethane	0.01	< 0.01	90	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Iodomethane	0.03	< 0.03	NS	< 0.03	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Carbon disulfide	0.02	< 0.02	106	< 0.02	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Methylene Chloride	0.1	< 0.1	97	< 0.1	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloroform	0.01	< 0.01	83	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,1-Trichloroethane	0.01	< 0.01	107	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Carbon Tetrachloride	0.01	< 0.01	100	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	0.05	< 0.05	102	< 0.05	2.57	3.88	2.71	3.09	3.31	3.79	3.79
1,2-Dichloroethane	0.01	< 0.01	113	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethane	0.01	< 0.01	115	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichloropropane	0.01	< 0.01	93	< 0.01	< 1.06	< 1.06	< 1.06	< 1.06	< 1.06	< 1.06	< 1.06
Toluene	0.05	< 0.05	99	< 0.05	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,1,2-Trichloroethane	0.02	< 0.02	83	< 0.02	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethane	0.01	< 0.01	96	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	0.01	< 0.01	99	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethylbenzene	0.01	< 0.01	95	< 0.01	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
M&P-Xylene	0.03	< 0.03	94	< 0.03	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
O-Xylene	0.01	< 0.01	84	< 0.01	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Styrene	0.02	< 0.02	80	< 0.02	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromoforn	0.01	< 0.01	86	< 0.01	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,4-Dichlorobenzene	0.02	< 0.02	NS	< 0.02	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Acrylonitrile	0.05	< 0.05	NS	< 0.05	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Field Standard	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d10-Ethylbenzene	99	112	99	95	126	100	100	70	92	70	70
Surrogate Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d4-1,2-Dichloroethane	115	117	96	114	118	117	117	116	120	123	123
d8-Toluene	100	106	97	99	101	100	101	100	101	97	97
4-Bromofluorobenzene	96	104	104	85	93	90	83	90	91	99	99
Internal Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Bromochloromethane	110	112	112	90	100	100	98	101	98	97	97
1,4-Difluorobenzene	127	109	109	105	112	117	114	117	114	108	108
d5-Chlorobenzene	108	102	102	89	90	96	96	95	94	94	94

ALS Environmental												
Instrument Column Acquisition Start Date	Sample Analysis Summary Report											
	MSD-3											
	Px4-624SII MS 1360231 9/20/2016											
Client Sample ID	Sample Matrix VOST Tube											
	Analysis Units ug/sample											
Laboratory Method Blank	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample	Laboratory Control Sample
Vost blank	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd	250ng-ControlStd
16092007.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D	16092006.D
1	1	1	1	1	1	1	1	1	1	1	1	1
9/20/2016 14:25	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44	9/20/2016 13:44
Conc. ug/sample	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Target Analyte ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
RL ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
Chloromethane	0.06	114	114	114	114	114	114	114	114	114	114	114
Vinyl Chloride	0.02	83	83	83	83	83	83	83	83	83	83	83
Bromomethane	0.09	65	65	65	65	65	65	65	65	65	65	65
Chloroethane	0.02	91	91	91	91	91	91	91	91	91	91	91
1,1-Dichloroethane	0.01	80	80	80	80	80	80	80	80	80	80	80
Iodomethane	0.03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Carbon disulfide	0.02	81	81	81	81	81	81	81	81	81	81	81
Methylene Chloride	0.1	85	85	85	85	85	85	85	85	85	85	85
Chloroform	0.01	71	71	71	71	71	71	71	71	71	71	71
1,1,1-Trichloroethane	0.01	95	95	95	95	95	95	95	95	95	95	95
Carbon Tetrachloride	0.01	115	115	115	115	115	115	115	115	115	115	115
Benzene	0.05	107	107	107	107	107	107	107	107	107	107	107
1,2-Dichloroethane	0.01	97	97	97	97	97	97	97	97	97	97	97
Trichloroethene	0.01	118	118	118	118	118	118	118	118	118	118	118
1,2-Dichloropropane	0.01	113	113	113	113	113	113	113	113	113	113	113
Toluene	0.05	87	87	87	87	87	87	87	87	87	87	87
1,1,2-Trichloroethane	0.02	88	88	88	88	88	88	88	88	88	88	88
Tetrachloroethane	0.01	95	95	95	95	95	95	95	95	95	95	95
Chlorobenzene	0.01	96	96	96	96	96	96	96	96	96	96	96
Ethylbenzene	0.03	92	92	92	92	92	92	92	92	92	92	92
M&P-Xylene	0.01	91	91	91	91	91	91	91	91	91	91	91
O-Xylene	0.01	81	81	81	81	81	81	81	81	81	81	81
Styrene	0.02	73	73	73	73	73	73	73	73	73	73	73
Bromoforn	0.01	68	68	68	68	68	68	68	68	68	68	68
1,4-Difluorobenzene	0.02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acrylonitrile	0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Field Standard	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d10-Ethylbenzene	81	81	83	83	83	83	83	83	83	83	83	83
Surrogate Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d4-1,2-Dichloroethane	114	114	91	91	91	91	91	91	91	91	91	91
d8-Toluene	98	98	93	93	93	93	93	93	93	93	93	93
4-Bromofluorobenzene	91	91	102	102	102	102	102	102	102	102	102	102
Internal Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Bromochloromethane	102	102	100	100	100	100	100	100	100	100	100	100
1,4-Difluorobenzene	114	114	86	86	86	86	86	86	86	86	86	86
d5-Chlorobenzene	101	101	89	89	89	89	89	89	89	89	89	89
C-0031-3C (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-29	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D	16092008.D
9/20/2016 15:09	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34	9/20/2016 15:34
C-0031-2D (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-19	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D	16092009.D
9/20/2016 16:00	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25	9/20/2016 16:25
C-0031-3A (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-25	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D	16092010.D
9/20/2016 16:50	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16	9/20/2016 17:16
C-0031-3B (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-27	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D	16092011.D
9/20/2016 16:25	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50
C-0031-1E (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-9	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D	16092012.D
9/20/2016 16:25	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50	9/20/2016 16:50
C-0031-2E (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-21	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D	16092013.D
9/20/2016 17:16	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41	9/20/2016 17:41
C-0031-2F (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-23	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D	16092014.D
9/20/2016 17:41	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07	9/20/2016 18:07
C-0031-1F (TENAX TUBE#1)	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
L1826815-11	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D	16092015.D
9/20/2016 18:07	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32	9/20/2016 18:32

ALS Environmental									
Sample Analysis Summary Report									
Instrument	MSD-3	Column	Rxi-624SH MS 1360231	Sample Matrix	VOST Tube	Analysis Units	ug/sample	Client Sample ID	
Acquisition Start Date	9/15/2016								
Laboratory Method Blank	250ng-controlstd	Laboratory Control Sample	Blank (TENAX TUBE#2 + ANASORB 747)	C-0031-2C	C-0031-2D	C-0031-2E	C-0031-2F	C-0031-3A	C-0031-3B
Laboratory Sample	16091508.D	16091509.D	16091510.D	16091511.D	16091512.D	16091513.D	16091514.D	16091515.D	16091516.D
Target Analyte	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample	Conc. ug/sample
Target Analyte	RI	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Chloromethane	0.05	< 83	< 83	< 83	< 83	< 83	< 83	< 83	< 83
Bromomethane	0.02	< 71	< 71	< 71	< 71	< 71	< 71	< 71	< 71
Chloroethane	0.09	< 56	< 56	< 56	< 56	< 56	< 56	< 56	< 56
1,1-Dichloroethane	0.01	< 83	< 83	< 83	< 83	< 83	< 83	< 83	< 83
Iodomethane	0.03	< 95	< 95	< 95	< 95	< 95	< 95	< 95	< 95
Carbon disulfide	0.02	< 92	< 92	< 92	< 92	< 92	< 92	< 92	< 92
Methylene Chloride	0.1	< 86	< 86	< 86	< 86	< 86	< 86	< 86	< 86
Bromochloromethane	0.01	< 83	< 83	< 83	< 83	< 83	< 83	< 83	< 83
1,1,1-Trichloroethane	0.01	< 47	< 47	< 47	< 47	< 47	< 47	< 47	< 47
Carbon Tetrachloride	0.01	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
1,2-Dichloroethane	0.05	< 96	< 96	< 96	< 96	< 96	< 96	< 96	< 96
Trichloroethane	0.01	< 86	< 86	< 86	< 86	< 86	< 86	< 86	< 86
1,2-Dichloropropane	0.01	< 99	< 99	< 99	< 99	< 99	< 99	< 99	< 99
Toluene	0.05	< 92	< 92	< 92	< 92	< 92	< 92	< 92	< 92
1,1,2-Trichloroethane	0.02	< 104	< 104	< 104	< 104	< 104	< 104	< 104	< 104
Tetrachloroethene	0.01	< 95	< 95	< 95	< 95	< 95	< 95	< 95	< 95
Chlorobenzene	0.01	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Ethylbenzene	0.01	< 103	< 103	< 103	< 103	< 103	< 103	< 103	< 103
M,p-Xylene	0.01	< 107	< 107	< 107	< 107	< 107	< 107	< 107	< 107
O-Xylene	0.01	< 107	< 107	< 107	< 107	< 107	< 107	< 107	< 107
Benzene	0.02	< 106	< 106	< 106	< 106	< 106	< 106	< 106	< 106
Styrene	0.01	< 105	< 105	< 105	< 105	< 105	< 105	< 105	< 105
1,1,2,2-Tetrachloroethane	0.02	< NS	< NS	< NS	< NS	< NS	< NS	< NS	< NS
Acrylonitrile	0.05	< NS	< NS	< NS	< NS	< NS	< NS	< NS	< NS
Field Standard									
d10-Ethylbenzene		105	117	NS	NS	NS	NS	NS	NS
Surrogate Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d4-1,2-Dichloroethane		105	80	109	110	109	108	106	108
d8-Toluene		105	97	107	108	107	106	102	106
4-Bromofluorobenzene		92	113	86	85	87	86	96	85
Internal Standards		% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
Bromochloromethane		106	94	98	98	99	107	103	100
1,4-Difluorobenzene		126	89	112	113	116	116	118	122
d5-Chlorobenzene		121	93	102	101	105	112	113	111

ALS Environmental									
Sample Analysis Summary Report									
Instrument Column Acquisition Start Date	MSD-3 Rxi-624Sil MS 1360231 9/16/2016	Sample Matrix Analysis Units		VOST Tube ug/sample					
Client Sample ID	Laboratory Method Blank	Laboratory Control Sample	C-0031-1A (TENAX TUBE#1)	C-0031-1D (TENAX TUBE#1)	C-0031-2A (TENAX TUBE#1)	Targeted Recovery Control Limits			
ALS Sample ID Filename	vost-blank 16091607.D	250ng-Controlstd 16091606.D	L1826815-1 16091608.D	L1826815-7 16091609.D	L1826815-13 16091610.D				
Dilution Factor	1	1	1	1	1				
Sampling date	9/16/2016 15:27	9/16/2016 14:45	9/16/2016 16:06	9/16/2016 15:44	9/16/2016 17:22				
Acquisition Time	9/16/2016 15:27	9/16/2016 14:45	9/16/2016 16:06	9/16/2016 15:44	9/16/2016 17:22				
Target Analyte	RL ug/sample	Conc. ug/sample	% Rec	Conc. ug/sample	Conc. ug/sample				
Chloromethane	0.06	<	116	<0.06	<0.06				
Vinyl Chloride	0.02	<	78	<0.02	<0.02				
Bromomethane	0.09	<	69	<0.09	<0.09				
Chloroethane	0.02	<	86	<0.02	<0.02				
1,1-Dichloroethane	0.01	<	75	<0.01	<0.01				
Iodomethane	0.03	<	NS	<0.03	<0.03				
Carbon disulfide	0.02	<	93	0.023	<0.02				
Methylene Chloride	0.1	<	76	<0.1	<0.1				
Chloroform	0.01	<	67	<0.01	<0.01				
1,1,1-Trichloroethane	0.01	<	91	<0.01	<0.01				
Carbon Tetrachloride	0.01	<	96	<0.01	<0.01				
Benzene	0.05	<	90	3.24 E	2.45 E				
1,2-Dichloroethane	0.01	<	84	<0.01	<0.01				
Trichloroethene	0.01	<	98	<0.01	<0.01				
1,2-Dichloropropane	0.01	<	95	<0.01	<0.01				
Toluene	0.05	<	74	0.738	0.622				
1,1,2-Trichloroethane	0.02	<	80	<0.02	<0.02				
Tetrachloroethene	0.01	<	73	<0.01	<0.01				
Chlorobenzene	0.01	<	79	<0.01	<0.01				
Ethylbenzene	0.01	<	81	0.022	0.017				
M&P-Xylene	0.03	<	80	0.264	0.226				
O-Xylene	0.01	<	78	0.058	0.047				
Styrene	0.02	<	70	0.083	0.072				
Bromoform	0.01	<	72	<0.01	<0.01				
1,1,1,2-Tetrachloroethane	0.02	<	72	<0.02	<0.02				
Acrylonitrile	0.05	<	NS	<0.05	<0.05				
Field Standard		% Rec	% Rec	% Rec	% Rec				
d10-Ethylbenzene	76	76	77	87	78				
Surrogate Standards		% Rec	% Rec	% Rec	% Rec				
d4-1,2-Dichloroethane	115	115	92	111	103				
d8-Toluene	98	98	94	94	101				
4-Bromofluorobenzene	87	87	99	107	83				
Internal Standards		% Rec	% Rec	% Rec	% Rec				
Bromochloromethane	113	113	108	110	128				
1,4-Difluorobenzene	132	132	102	125	152				
d5-Chlorobenzene	120	120	104	119	125				



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
Phone: 905-331-3111, FAX: 905-331-4567

## Certificate of Analysis

**ALS Project Contact:** Whitney Davis  
**ALS Project ID:** EQM100  
**ALS WO#:** L1830034  
**Date of Report:** 30-Sep-16  
**Date of Sample Receipt:** 16-Sep-16

**Client Name:** Environmental Quality Management Inc.  
**Client Address:** 1800 Carillon Boulevard  
Cincinnati, OH 45240  
United States  
**Client Contact:** Doug Allen  
**Client Project ID:** AK Middletown ICR

**COMMENTS:** VOCs via SW846 Method 5041A/8260B

NS	indicates that compound was not spiked
E	indicates that compound response exceeds instrument calibration range of 1.0 ug
X	indicates that compound value is biased high due to low addition of internal standards.
L	indicates that compound response recovery is below 50%.
C	indicates a suspected contamination.

For the sample C-0031-4A (TENAX TUBE#1), there is indication that an incomplete aliquot of internal standard was added. As a result, the results are likely biased high.

For selected diluted (TENAX TUBE#2 + ANASORB 747) samples there are detected levels of methylene chloride. This is a known laboratory and field contaminant. The reported values may be elevated.

**S.Kennedy 30-Sep-16**

Certified by:

  
Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Instrument Column Acquisition Start Date	MSD-3 Rxi-624SII MS 1360231 9/28/2016	Sample Matrix		Sample Matrix		Sample Matrix		Sample Matrix																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		Laboratory Method Blank	Laboratory Control Sample	C-0031-4A (TENAX TUBE#2 + ANASORB 747)	C-0031-4D (TENAX TUBE#2 + ANASORB 747)	C-0031-4E (TENAX TUBE#2 + ANASORB 747)	C-0031-4C (TENAX TUBE#2 + ANASORB 747)	C-0031-4F (TENAX TUBE#2 + ANASORB 747)	Recovery Control Limits																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Client Sample ID	ALS Sample ID	File Name	Dilution	Sampling date	Acquisition Time	Target Analyte	RL ug/sample	Conc. ug/sample	% Rec	Laboratory Control Sample	C-0031-BLANK (TENAX TUBE#2 + ANASORB 747)	L1830034-14 16092807.D	1	9/15/2016	9/28/2016 14:43	9/28/2016 15:22	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15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## **HYDROGEN CHLORIDE AND HYDROGEN FLUORIDE**



1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6  
Phone: 905-331-3111, FAX: 905-331-4567

## Certificate of Analysis

ALS Project Contact: Whitney Davis  
ALS Project ID: EQM100  
ALS WO#: L1827080  
Date of Report: 23-Sep-16  
Date of Sample Receipt: 9-Sep-16

Client Name: Environmental Quality Management Inc.  
Client Address: 1800 Carillon Boulevard  
Cincinnati, Oh 45240  
(513) 825-7500  
Client Contact: Doug Allen  
Client Project ID: 50074.0172 AK STEEL ICR

### COMMENTS:

CI as HCl Anion Analysed via Ion Chromatography Method USEPA 26 (FE 20-Sep-2016)  
F as HF Anion Analysed via Ion Chromatography Method USEPA 26 (FE 20-Sep-2016)

LOR = Limit of Reporting

LCB = Laboratory Control Blank (limits: <LOR)

LCS = Laboratory Control Sample (limits: 90-110%)

MS = Matrix Spike Sample (limits: 90-110%, NH<sub>3</sub>: 85-115%)

RPD = Relative Percent Difference (limits: <20% for sample duplicate, <10% for duplicate injection)

CVS = Calibration Verification Standard (limits: 90-110%)

Certified by: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "Whitney Davis", is written over a horizontal line.

Whitney Davis  
Account Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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# ALS Environmental

## Sample Analysis Summary Report

Sample Name	P-26-1	P-26-2	P-26-3	P-26-4	C-26-1
ALS Sample ID	L1827080-1	L1827080-2	L1827080-3	L1827080-4	L1827080-5
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	23-Aug-16	23-Aug-16	24-Aug-16	24-Aug-16	6-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
<b>Ion Chromatography Analysis</b>					
Method 26A	mg	mg	mg	mg	mg
Total F <sup>-</sup> as HF (ave)	<0.107	<0.119	<0.117	<0.116	0.329
Analysis 1	<0.107	<0.119	<0.117	<0.116	0.331
Analysis 2	<0.107	<0.119	<0.117	<0.116	0.327
Total Cl <sup>-</sup> as HCl (ave)	0.408	0.440	0.334	0.379	11.6
Analysis 1	0.407	0.446	0.342	0.389	11.6
Analysis 2	0.410	0.434	0.325	0.370	11.5

# ALS Environmental

## Sample Analysis Summary Report

Sample Name	C-26-2	C-26-3	0.1N H2SO4 BLANK	H2O BLANK
ALS Sample ID	L1827080-6	L1827080-7	L1827080-8	L1827080-9
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample
Sampling Date/Time	8-Sep-16	8-Sep-16	8-Sep-16	8-Sep-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
<b>Ion Chromatography Analysis</b>				
Method 26A	mg	mg	mg	mg
Total F <sup>-</sup> as HF (ave)	0.313	0.305	<0.0754	<0.0403
Analysis 1	0.311	0.305	<0.0754	<0.0403
Analysis 2	0.315	0.306	<0.0754	<0.0403
Total Cl <sup>-</sup> as HCl (ave)	6.87	9.21	0.144	<0.0710
Analysis 1	6.88	9.22	0.142	<0.0710
Analysis 2	6.86	9.20	0.146	<0.0710

# ALS Environmental

## Sample QC Summary Report

Sample Name	LCB	LCS	LCS
ALS Sample ID	LCB	LCS	LCS
Matrix	Stack	Stack	Stack
Analysis type	Method Blank	Blank Spike	Blank Spike
Sampling Date/Time	n/a	n/a	n/a
Date of Receipt	n/a	n/a	n/a
<b>Ion Chromatography Analysis</b>			
Method 26A	mg	mg	% Rec
Total F <sup>-</sup> as HF (ave)	<0.0175	0.517	97%
Analysis 1	<0.0175	0.514	
Analysis 2	<0.0175	0.519	
Total Cl <sup>-</sup> as HCl (ave)	<0.0309	0.756	95%
Analysis 1	<0.0309	0.747	
Analysis 2	<0.0309	0.765	

# ALS Environmental

## Sample QC Summary Report

Sample Name	P-26-1	P-26-1	P-26-1	P-26-1
ALS Sample ID	L1827080-1	L1827080-1DUP	L1827080-1MS	L1827080-1MS
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time	23-Aug-16	23-Aug-16	23-Aug-16	23-Aug-16
Date of Receipt	9-Sep-16	9-Sep-16	9-Sep-16	9-Sep-16
<b>Ion Chromatography Analysis</b>				
Method 26A	mg	mg	mg	% Rec
Total F <sup>-</sup> as HF (ave)	<0.107	<0.107	3.21	99%
Analysis 1	<0.107	<0.107	3.21	
Analysis 2	<0.107	<0.107	3.20	
Total Cl <sup>-</sup> as HCl (ave)	0.408	0.405	4.98	97%
Analysis 1	0.407	0.413	4.98	
Analysis 2	0.410	0.398	4.98	

## **HYDROGEN CYANIDE**

**Attention: Whitney Davis**

ALS Environmental  
1435 Norjohn Court  
Unit 1  
Burlington, ON  
CANADA L7L 0E6

**Report Date: 2016/10/07**

**Report #: R4194197**

**Version: 1 - Final**

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6J5237**

**Received: 2016/09/13, 12:22**


Sample Matrix: Stack Sampling Train  
# Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Hydrogen Cyanide Emissions (OTM29)	20	2016/09/21	2016/09/21	CAM SOP-00466	EPA OTM-29 m
Volume of Sodium Hydroxide Impinger	20	N/A	2016/10/02		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

  
Clayton Johnson  
Project Manager - Air Toxics, Source Evaluation  
07 Oct 2016 13:54:06 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Clayton Johnson, Project Manager - Air Toxics, Source Evaluation

Email: CJohnson@maxxam.ca

Phone# (905)817-5769

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**EPA OTM 029 HYDROGEN CYANIDE (STACK SAMPLING TRAIN)**

Maxxam ID		DBC972		DBC975	DBC976			
Sampling Date		2016/09/08		2016/09/08	2016/08/25			
	UNITS	HCN BLANK- 0.1N NAOH	RDL	HCN BLANK- 6N NAOH	P- HCN- FB- IMP1&2	RDL	QC Batch	MDL
Sodium Hydroxide Volume	ml	100	1	195	225	1	4670480	1
<b>Inorganics</b>								
Hydrogen Cyanide	ug	<20	20	<100	<100	100	4670469	3
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam ID		DBC977		DBC978		DBC979		
Sampling Date		2016/08/25		2016/09/08		2016/09/08		
	UNITS	P- HCN- FB- IMP3	RDL	C- HCN- FB- IMP1&2	RDL	C- HCN- FB- IMP3	RDL	QC Batch MDL
Sodium Hydroxide Volume	ml	120	1	250	1	95	1	4670480 1
<b>Inorganics</b>								
Hydrogen Cyanide	ug	<60	60	<100	100	<50	50	4670469 3
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam ID		DBC980		DBC981		DBC982		DBC983		
Sampling Date		2016/08/23		2016/08/23		2016/08/23		2016/08/23		
	UNITS	P- HCN- 1- IMP1&2	RDL	P- HCN- 1- IMP3	RDL	P- HCN- 2- IMP1&2	RDL	P- HCN- 2- IMP3	RDL	QC Batch MDL
Sodium Hydroxide Volume	ml	205	1	112	1	222	1	115	1	4670480 1
<b>Inorganics</b>										
Hydrogen Cyanide	ug	180	100	<60	60	160	100	<60	60	4670469 3
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

Maxxam ID		DBC984		DBC985		DBC986		DBC987		
Sampling Date		2016/08/24		2016/08/24		2016/08/25		2016/08/25		
	UNITS	P- HCN- 3- IMP1&2	RDL	P- HCN- 3- IMP3	RDL	P- HCN- 4- IMP1&2	RDL	P- HCN- 4- IMP3	RDL	QC Batch MDL
Sodium Hydroxide Volume	ml	245	1	105	1	242	1	120	1	4670480 1
<b>Inorganics</b>										
Hydrogen Cyanide	ug	110	100	<50	50	150	100	<60	60	4670470 3
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

**EPA OTM 029 HYDROGEN CYANIDE (STACK SAMPLING TRAIN)**

Maxxam ID		DBC988		DBC989		DBC990		DBC991			
Sampling Date		2016/09/06		2016/09/06		2016/09/08		2016/09/08			
	UNITS	C- HCN- 1- IMP1&2	RDL	C- HCN- 1- IMP3	RDL	C- HCN- 2- IMP1&2	RDL	C- HCN- 2- IMP3	RDL	QC Batch	MDL
Sodium Hydroxide Volume	ml	287	1	130	1	310	1	117	1	4670480	1
<b>Inorganics</b>											
Hydrogen Cyanide	ug	390	100	<70	70	390	200	<60	60	4670470	3
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											

Maxxam ID		DBC992		DBC993			
Sampling Date		2016/09/08		2016/09/08			
	UNITS	C- HCN- 3- IMP1&2	RDL	C- HCN- 3- IMP3	RDL	QC Batch	MDL
Sodium Hydroxide Volume	ml	310	1	125	1	4670480	1
<b>Inorganics</b>							
Hydrogen Cyanide	ug	530	200	<60	60	4670470	3
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam Job #: B6J5237  
Report Date: 2016/10/07

ALS Environmental

### TEST SUMMARY

**Maxxam ID:** DBC972  
**Sample ID:** HCN BLANK- 0.1N NAOH  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC975  
**Sample ID:** HCN BLANK- 6N NAOH  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC976  
**Sample ID:** P- HCN- FB- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/25  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC977  
**Sample ID:** P- HCN- FB- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/25  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC978  
**Sample ID:** C- HCN- FB- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC979  
**Sample ID:** C- HCN- FB- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

### TEST SUMMARY

**Maxxam ID:** DBC980  
**Sample ID:** P- HCN- 1- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/23  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC980 Dup  
**Sample ID:** P- HCN- 1- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/23  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le

**Maxxam ID:** DBC981  
**Sample ID:** P- HCN- 1- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/23  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC982  
**Sample ID:** P- HCN- 2- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/23  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC983  
**Sample ID:** P- HCN- 2- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/23  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670469	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC984  
**Sample ID:** P- HCN- 3- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/24  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

### TEST SUMMARY

**Maxxam ID:** DBC985  
**Sample ID:** P- HCN- 3- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/24  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC986  
**Sample ID:** P- HCN- 4- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/25  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC986 Dup  
**Sample ID:** P- HCN- 4- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/25  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le

**Maxxam ID:** DBC987  
**Sample ID:** P- HCN- 4- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/08/25  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC988  
**Sample ID:** C- HCN- 1- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/06  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC989  
**Sample ID:** C- HCN- 1- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/06  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

Maxxam Job #: B6J5237  
Report Date: 2016/10/07

ALS Environmental

## TEST SUMMARY

**Maxxam ID:** DBC990  
**Sample ID:** C- HCN- 2- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC991  
**Sample ID:** C- HCN- 2- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC992  
**Sample ID:** C- HCN- 3- IMP1&2  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**Maxxam ID:** DBC993  
**Sample ID:** C- HCN- 3- IMP3  
**Matrix:** Stack Sampling Train

**Collected:** 2016/09/08  
**Shipped:**  
**Received:** 2016/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Cyanide Emissions (OTM29)	IC/SPEC	4670470	2016/09/21	2016/09/21	Lang Le
Volume of Sodium Hydroxide Impinger		4670480	N/A	2016/10/02	Frank Mo

**GENERAL COMMENTS**

**EPA OTM 029 HYDROGEN CYANIDE (STACK SAMPLING TRAIN)**

Hydrogen Cyanide Emissions (OTM29): Some samples were analyzed past hold-time. The samples were re-analyzed and confirmed on different days.

**Results relate only to the items tested.**

### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4670469	LLE	Matrix Spike(DBC980)	Hydrogen Cyanide	2016/09/21		116	%	N/A
4670469	LLE	Spiked Blank	Hydrogen Cyanide	2016/09/21		105	%	90 - 110
4670469	LLE	Method Blank	Hydrogen Cyanide	2016/09/21	<30		ug	
4670469	LLE	RPD - Sample/Sample Dup	Hydrogen Cyanide	2016/09/21	NC		%	20
4670470	LLE	Matrix Spike(DBC986)	Hydrogen Cyanide	2016/09/21		111	%	N/A
4670470	LLE	Spiked Blank	Hydrogen Cyanide	2016/09/21		99	%	90 - 110
4670470	LLE	Method Blank	Hydrogen Cyanide	2016/09/21	<20		ug	
4670470	LLE	RPD - Sample/Sample Dup	Hydrogen Cyanide	2016/09/21	NC		%	20

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Frank Mo, B.Sc., Inorganic Lab. Manager

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.